

Access, Adequacy, and Equity in Education Technology

Results of a Survey of
America's Teachers and
Support Professionals
on Technology in Public
Schools and Classrooms



May 2008

A Publication of the
National Education Association
In collaboration with the
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*Great Public Schools
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Preface

As public school educators face mounting pressure to uphold professional standards for themselves and academic standards for their students, they need the resources and support necessary to meet these challenges. Although technology is arguably one of the more important resources in education, we know far too little about how much access educators really have to adequate technology because technology is so variable and difficult to measure at the school level. Therefore, the National Education Association (NEA) and the American Federation of Teachers (AFT) sought to examine the state of resources and the support provided for education technology in public schools and classrooms nationwide through a joint membership survey. As advocates for educators, both organizations firmly believe that access, adequacy, and equitable distribution of technology across schools and classrooms is critical for educators to prepare their students for success in this changing global society. This collaboration between the NEA and AFT represents not only a desire to assess the realities of educational technology but also a declaration of our commitment to meeting the needs of educators and students.

This report highlights data from the third survey in a series whose first two components the NEA conducted in 1998 and 2001 and reported in *Gains and Gaps in Education Technology: An NEA Survey of Educational Technologies in Schools* (NEA 2004). This survey builds on the concerns and constituencies of the two earlier surveys and, through the collaboration of the AFT, now includes a larger pool of educators from the nation's largest urban school districts. With this expansion of the survey sample, the current data represent a more demographically varied group of educators working in a broader range of settings. In addition to its greater breadth, this new survey and report give particular attention to issues of equity across the various groups of educators. These groups are defined in several ways: by their school's community type (i.e., urban, suburban, or rural); the grade level in which the educators work; and their years of work experience. Although the report does not cover all aspects of education technology in the schools, it does present an in-depth examination of specific issues in education technology from the sole perspective of America's educators. Moreover, the study offers recommendations for policymakers and researchers to help ensure that educators have the resources and support they need not only to benefit immediately from education technology but also to help ensure that their evolving needs are continually articulated, understood, and met.

Many thanks to the staff at the NEA and AFT who provided reviews and feedback—from the redesign of the survey to the writing of the report. This report was prepared with much insight and thoughtful debate through the collective wisdom of staff in the NEA Departments of Education Policy and Practice; Research; External Partnerships and Advocacy; and Teacher Quality; and the AFT Departments of Educational Issues and Research.

Kathy Tuck prepared this report through the NEA Departments of Research and Education Policy and Practice. For questions, please email her at ktuck@nea.org.



High School Library, Orlando, Florida © NEA

Executive Summary

Over the past decade, the public education system has made great strides in infusing technology into the administration of schools and into the instructional process itself. School districts have invested heavily in the infrastructures required to accommodate computers and the Internet, commandeered resources to purchase software and technical support for students and staff, and mandated professional development for educators and administrators. Some have even established curriculum standards to ensure that students achieve a certain level of technological competency before they graduate.

Yet, despite these significant investments of resources and time, the debate on education technology is still largely unresolved. Mounting evidence shows that technology improves efficiency among educators and increases motivation in students. However, the effect of technology on student achievement is not well documented. One of the reasons for this shortage of information is that the uneven distribution of technology and professional development in school districts and even inside school buildings presents a challenge for measuring the broad-scale impact of technology on student achievement. Most studies showing positive outcomes have been limited in scope and have included only small populations of students and educators. The present study broadens the scope of our knowledge about the distribution of technology and emphasizes the need for education policymakers and administrators to remain committed to the implementation of technology in schools. This study further emphasizes the need for all educators and students to have equal opportunities to use technology for the greatest benefit to teaching and learning. Issues related to staff training and use of technology are explored extensively, as are the types of technologies and frequencies that educators require students to use different technologies. By exploring these particular issues, we are better able to observe the potential impact of technology on student achievement.

The findings of this study reveal that although all educators and students in public schools have some access to computers and the Internet, we have few assurances that they are able to use technology effectively for teaching and learning. This report describes the current state of technology in public schools and classrooms, as reported directly by classroom teachers and instructional assistants who use technology at school for administrative tasks, research and communications, instructional preparation and planning, individualized lesson design, and other tasks related to their role in teaching and learning. The findings for various demographic groupings also highlight the disparities found in different community types, school levels, and career stages of educators on their technology and support. In addition, recommendations are offered to help guide policymakers in all levels of administration toward ensuring that educators and students have adequate opportunities to use technology effectively as an instructional tool.

Major Findings

The findings below (corresponding to Findings 1–9 in the main text of the report) are major findings for the the four key technology areas covered by the survey: access to technology and support, technology training, use of technology, and perceptions of technology. Appended to each of the nine major findings are additional findings of the survey (drawn from Findings 10–22 in the main text of the report) about educators’ demographic differences relating to those four key technology areas.

Access to Technology and Support

Findings for technology access and support indicate that although schools had accumulated technology hardware for students’ use, it was not adequate in most schools to meet the demands of classroom instruction. Further, many teachers still believed that their access to instructional software and technical support was not adequate.

Finding 1. The number of computers in public school classrooms was not adequate to use computers effectively for classroom instruction, and the classroom was not the main location in school where most students used computers.

More than half of public school educators had no more than two computers available for students’ use in their classroom or primary work area, and that level of access was inadequate for educators to use computers effectively in classroom instruction. Educators in elementary schools had more computers inside the classrooms for students’ use, whereas secondary schools had more computers in the technology labs. Secondary schools had more laptops available for short-term use in the classroom when necessary.

Finding 2: Most of the educators believed that their own access to technology at school was adequate to do their job, but they reported receiving little support for technology access outside of school.

Whereas rural/small town educators were least likely to receive support for personal technology, urban educators were most likely to be provided with a laptop computer for work purposes inside and outside of school, and they were as likely as suburban educators to receive assistance to purchase a computer for home. Educators in secondary schools were less likely than those in elementary schools to believe that their own access to technology was sufficient to do their jobs effectively.

Finding 3: Access to the Internet and instructional software at school was adequate for most educators, but technical assistance and support in using the equipment and software were often inadequate.

The software and condition of the equipment in urban schools was likely to be less adequate, compared with suburban and rural/small town schools, and technical support for using the equipment and software was less adequate in urban schools. Elementary educators were less likely to be satisfied with the software for their students, and they were less likely to have access to high-speed Internet connections for their students.

Technology Training

Results show that the training educators receive on using technology has been more effective for administrative tasks than for instruction and that training has been more accessible to educators in certain demographic groups.

Finding 4: School districts required professional development in technology for the majority of educators, but most educators believed that their training had been more effective for noninstructional tasks. Educators with the most job experience were more likely to participate in technology training and more likely to believe that their training was adequate, but less experienced educators were more satisfied with their knowledge of technology and its impact on their own jobs. Urban school educators were the least likely to receive adequate training to use technology, particularly in using administrative and instructional software and in designing individual lessons for students. Educators in middle schools were more satisfied with their technology training than educators at any other school level.

Use of Technology

Both educators' and students' use of technology for instruction has been limited in scope and infrequent.

Finding 5: Despite educators' limited access to technology training, computers and the Internet were the leading technologies used in public schools, rendering certain other types of technology nearly obsolete. Educators in elementary schools were the most likely to have used other types of technologies at school recently (e.g., videos, compact discs, and cable and satellite television), and educators in urban schools were the least likely.

Finding 6: Most educators used technology regularly at school for administrative tasks, but substantially fewer used it for instruction-related tasks. Educators with less experience were more likely than educators with more experience to use technology for instructional purposes. Urban school educators used computers much less frequently than did other educators for both administrative and instructional tasks.

Finding 7: About half of the educators required their students to use technology at school for individual research and problem solving, but only a few educators reported that they required their students to use computers regularly. Only one-third of educators reported that they required their students to use computers at least a few times a week.

Perceptions of Technology

Most educators have positive perceptions about the value of technology for teaching and learning.

Finding 8: Most educators surveyed were highly optimistic about the impact of technology on their jobs and on their students, and they considered technology essential to teaching and learning. Most believed that technology had improved students' motivation for learning. Educators in suburban schools were the least positive about the impact of technology on teaching and learning. Educators in secondary schools were less likely than elementary educators to be satisfied with their students' reliance on technology.

Finding 9: Educators asserted that their unions or education associations should be more involved in advocacy for technology, particularly regarding increased funding and more equitable distribution of technology in schools. Educators displayed notable differences in their perspectives on their union's or education association's involvement based on their level of experience and certain school characteristics. Urban educators believed their union or education association should help advocate for more equitable technology across schools. Less experienced educators overwhelmingly believed that their Associations should advocate for more technology funding. Mid-career educators were not as optimistic about the effectiveness of their Associations' advocacy in this area. Finally, secondary school educators were the least likely to want their Associations to advocate for technology.

Discussion

Despite the progress schools have made in bringing computers and the Internet to students and staff, these groups need still greater access if technology is to become a reliable tool for teaching and learning. The findings from the present study and other recent studies show that technology is woefully inadequate in most classrooms.



Elementary School, Kalamazoo, Michigan © NEA

It is there that most instruction occurs, yet most educators in this study reported that the classroom was not the main location in school in which their students used computers. To help fill the gap left by the shortage of classroom-based computers, some districts are beginning to rely more on portable and wireless computers. In addition to being movable from classroom to classroom, such computers can even be used outside of school. Districts all over the country are beginning to seek public and private resources to help implement laptop programs for student and staff, and they are seeking ways to install wireless infrastructures to permit more flexibility in the use of their school technologies (Apple Education 2007a; Education World 2005).

Although access to the Internet, software, and technical support was adequate for most educators surveyed, the demographic differences are quite apparent. For example, educators working in the early grades need more age-appropriate software for their students. Some districts

are focusing on teaching technology skills through an integrative approach, building on skills across the grades (Mehlinger 1997). Educators working in urban schools, who have relied on the e-rate fund to assist with Internet connectivity, are now seeking other resources to help upgrade software and to provide maintenance and upgrades for their computers. Urban educators, in particular, also need greater technical support for helping to set up and use technology in their classrooms. Experts agree that supporting technology maintenance and technical personnel make up a large part of the school technology budget, but most often these factors do not receive proper attention during the planning phase (Borja 2007).

Although educators are required to participate in technology training, most of them—particularly those in urban and rural schools, as opposed to suburban schools—do not feel prepared to use technology for instructional purposes, especially for individualized instruction. Some advocates strongly argue that schools of education should put more emphasis on technology in their teacher preparation programs, rather than leaving it up to school districts. Even so, only 19 states have requirements in place to ensure technology competency before issuing an initial teaching license (Bausell and Klemick 2007). Experts further believe that teachers should be prepared to use technology to deliver alternative types of pedagogy, such as inquiry learning, models, and simulations to help student develop higher-order thinking skills. However, such uses are not widely observed, and standards for technology used by teachers and students are not applied. Of the 48 states with technology standards, only 4 test students on their knowledge of technology (Blausell and Klemick 2007). To be sure, the full integration of technology into teaching and learning will require a systematic and balanced approach that goes beyond just acquiring computer hardware and using limited technology skills.

Despite funding and policy constraints, many states and districts have found the resources and opportunities to engage their schools and classrooms in a technology-enriched curricula, and they have been able to demonstrate positive links to achievement (Murphy and others 2002; O'Dwyer and others 2005). In addition, enthusiasm for technology has led many school districts to alter not only the curriculum but also the way that curriculum is delivered. For example, by recent counts, at least 23 states have virtual school programs that permit students to receive instruction online (Robelen 2007). Moreover, whereas the vast majority of educators in this study agreed that technology is essential to teaching and learning, educators in urban schools were more likely to believe technology had increased the motivation of their students.

As further noted in this study, educators overwhelmingly want their unions or education associations to become involved in school technology issues, particularly in issues of funding and more equitable distribution. Newer educators, urban educators, and educators in elementary schools show particular support for involving their unions in school technology issues.



Middle School, San Jose, California © NEA

Recommendations

The findings from this survey suggest several recommendations for education policymakers, advocates, and practitioners to consider as they plan to purchase and integrate technology into schools and classrooms. These recommendations aim at the following goals:

1. To improve students' and educators' access to technology in the classroom (or primary work place), as well as outside of the school, by providing more wireless and portable technology.
2. To increase educators' and students' access to high-speed Internet services and more appropriate instructional software. In addition, to increase access to technical assistance and maintenance support for using technology.
3. To expand professional development in technology by providing more appropriate training for educators to use technology. In addition, to integrate technology deeper into the school curriculum by establishing standards for student usage, and to capitalize on the positive perceptions and enthusiasm that educators have for education technology to help increase student achievement.
4. To engage unions and education associations actively in advocacy and resource roles to help support states and districts in planning and implementing education technology.
5. To expand professional development in technology by providing more appropriate training for educators to use technology.



High School, Orlando Florida © NEA

1

Introduction

As we look toward the future of public education and its role in the course of our nation, most educators envision public schools as cornerstones of progress and innovation. Yet, to achieve this goal and reap the benefits of an educated society, education policymakers and those working inside schools and classrooms must align their respective visions of public education and agree on the best course of action to reach the goal. Education technology is one component of comprehensive school reform where progress toward full implementation in schools has lagged, partly because of competing priorities but also because of the lack of reliable information, resources, and expertise on which to make decisions and guide implementation of policies.

The present study of education technology issues in the nation's public schools and classrooms is offered as a resource to help policymakers, researchers, and educators gain further insight into access, adequacy, and equity in education technology. These findings represent one of the most comprehensive sources of national data on education technology collected directly from classroom teachers and other classroom personnel who provide instruction to students.

The findings of this study focus primarily on (a) access to technology in the classroom for educators and students; (b) connectivity to the Internet and access to appropriate software; (c) adequacy of technical support and maintenance; (d) technology training for classroom teachers and instructional assistants; (e) effective use of technology by educators in their jobs and by students; and (f) perceptions of educators on the value of education technology. The overall results of the study are presented here, along with findings for particular groups of educators that differ along the lines of school community type (e.g., urban, suburban, and rural/small town); grade level of the school at which they are employed; and level of work experience. In addition to the findings, recommendations for policy are offered and discussed within the context of other research related to education technology in public schools and classrooms. A section at the end of the report presents these policy recommendations in greater detail.

Survey Methodology

In all, 1,934 educators working in public schools throughout the nation participated in the survey, representing a margin of error of ± 3 percent; 95 percent level of confidence. The survey sample was randomly selected from a sampling frame comprising members of the National Education Association (NEA) and members of the American Federation of Teachers (AFT). The sample was stratified by six regions of the country and an oversample of educators working in "large cities," as defined by the U.S. Department of Education, with populations greater than or equal to 250,000 (OMB 2000) and with at least 40,000 students enrolled in K–12 public schools. Weighting factors based on regional and community-type stratifications of the sampling frame were computed and appropriately applied. Educators participating in the survey

were contacted by telephone and administered the survey by trained survey professionals during summer 2006. An appendix to this report provides a copy of the survey instrument.

Characteristics of Survey Respondents

Educators participating in the survey represented a broad range of personal and professional characteristics, and the public schools they were working in varied across all grade levels and types of communities.

Professional

Educators participating in the survey consisted only of instructional personnel—mainly classroom teachers (90.4%), but also a sizable proportion (9.6%) of instructional assistants. About one-half of the educators (50.5%) had 21–30 students in their class(es). One-fifth (21.2%) had 16–20 students, and one-fifth (19.7%) had 15 or fewer students.

On average, educators had worked in education 17.8 years (median = 17.0 years), with slightly more than one-third (37.1%) having more than 20 years of experience (late career level). Nearly one-third (31.1%) of the educators had 11–20 years of experience in education (mid-career level), and nearly one-third (31.8%) had 10 or fewer years (early career level). New educators with fewer than 5 years of experience made up 11.9 percent of survey respondents. Educators participating in the study had been working in their current schools, on average, for 10.7 years.

Personal

More than one-half (56.8%) of the educators participating in the survey reported their highest educational degree as a master's degree. One-third (34.8%) reported their highest degree as a bachelor's degree, and 6.8 percent reported having an associate's degree or no degree beyond high school.

The vast majority of the educators were female (80.2%), with slightly more than one-third (36.4%) being 45 years old or younger and slightly more than one-third (37.5%) being between 46 and 55 years old. Nearly one-quarter (23.6%) of the educators were more than 55 years old.

The vast majority (84.4%) of the educators participating in the survey identified their race/ethnic group as Caucasian or white. A notable proportion (7.4%) identified themselves as black or African-American, and a similar proportion (7.6%) identified themselves as of Spanish, Hispanic, or Latino origin. Less than 1 percent of the educators identified themselves as American Indian or Alaskan Native, Asian, Native Hawaiian, or other Pacific Islander.

School

The educators in this study were nearly evenly split between those working in urban or city schools (29.1%), those working in suburban schools (29.0%), and those in small town schools (26.7%). A substantial number (14.0%) of educators also worked in rural schools.

Slightly fewer than half (45.6%) of the educators worked at the secondary level: 18.7 percent in junior high or middle school and 26.9 percent senior high school. Whereas slightly more educators (49.2%) were working at the elementary level, a small proportion (4.3%) further identified their school as an early childhood center.

2

Findings and Discussion on Technology

Findings on Technology Access

Finding 1: The number of computers in public school classrooms was not adequate to use computers effectively for classroom instruction, and the classroom was not the main location in school where most students used computers.

The vast majority (83.4%) of educators reported having five or fewer computers in their classroom (or primary work area) for students' use, and more than one-half (54.7%) reported having no more than two computers (Figure 1). In addition, fewer than half (44.6%) of the educators cited their classroom as the main location where their students worked on computers for class assignments (Figure 2).

Figure 1. Number of Computers in Classrooms for Students' Use

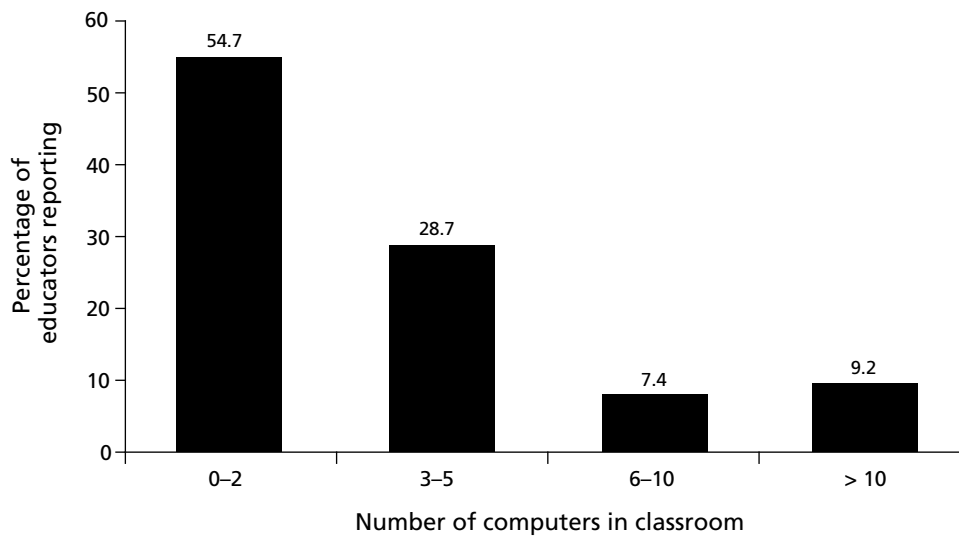
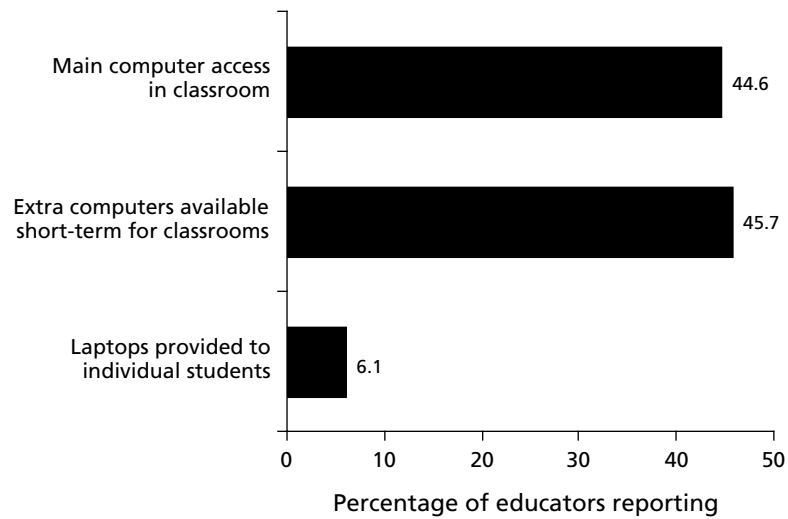
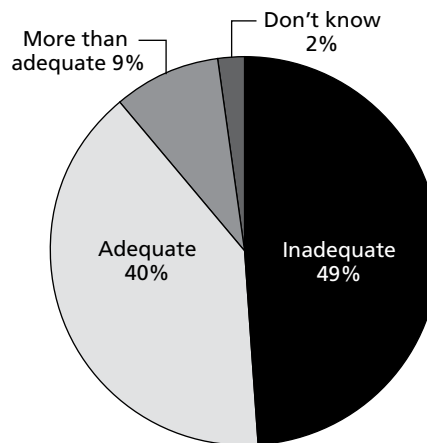


Figure 2. Classroom-Centered Computer Access

Most schools do not offer alternative resources to supplement the number of computers for classroom use. Fewer than half (45.7%) of the educators reported working in schools that had extra computers to bring into their classrooms on a short-term basis when necessary, such as portable carts with laptops, and only a few educators (6.1%) reported that their schools provided students with laptops for use inside and outside of school.

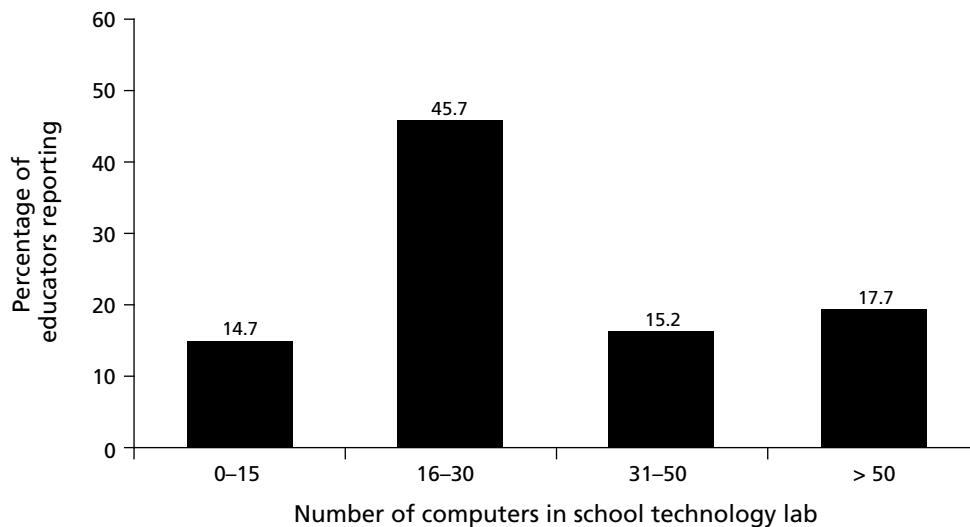
Overall, nearly one-half (49.1%) of the educators believed that the number of computers for students' use in their classrooms was inadequate (Figure 3). However, the even split between educators who believed the numbers of classroom computers were not adequate and those who believed computers were adequate or more than adequate provides a glimpse into the disparities found in schools and classrooms on technology described throughout this report.

Figure 3. Adequacy of the Number of Computers in the Classroom

Beyond the classroom, nearly one-half (45.7%) of educators reported that their schools had technology labs with 16–30 computers, but only one-third (32.9%) had more than 30 computers in the labs (Figure 4).

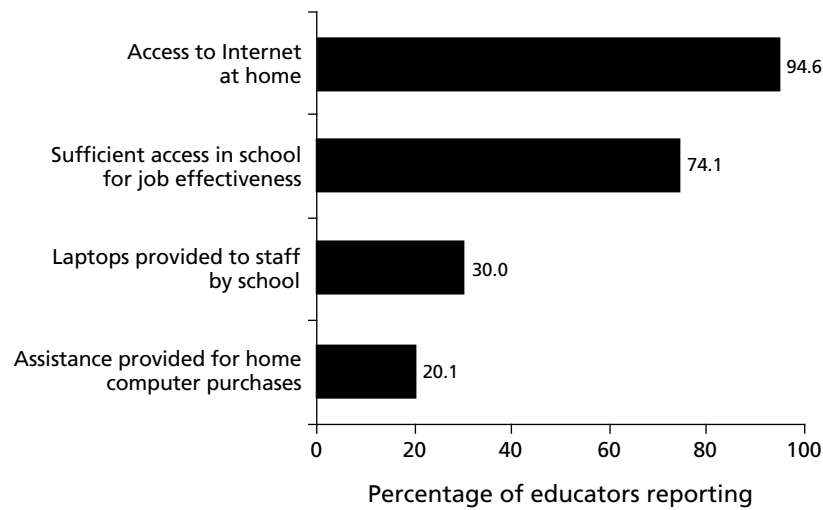
Note: In Figure 4 and subsequent graphs that illustrate educators' summative responses to a single question, percentages may add to less than 100. In such cases, this is because a small number of educators did not answer that question.

Figure 4. Number of Computers in School Technology Labs for Students' Use



Finding 2: Most of the educators believed that their own access to technology at school was adequate to do their job, but they reported receiving little support for technology access outside of school.

Nearly three-fourths (74.1%) of the educators believed they had sufficient access at school to the technology they needed to do their job effectively (Figure 5). However, fewer than one-third of the educators surveyed (30.0%) worked in schools that provided them with laptops for planning and instructional purposes inside and outside of school. In addition, only one-fifth (20.1%) of the educators worked in districts or states that provided assistance for them to purchase computers for use at home (e.g., through low-interest loans, grants, or discounts). Almost all (94.6%) of the educators reported having some access to computers and the Internet at home.

Figure 5. Educators' Personal Access to Technology

Discussion of Technology Access

Although we have made encouraging progress in putting computers and the Internet into schools, we are still woefully short of classroom environments that permit students to engage with technology in a way that prepares them to use technology in the real world. For technology to become a reliable tool for teaching and learning, and to integrate technology fully into the instructional process, educators and students must have adequate access to computers inside the classroom. Enough computers will need to be available to provide every student with access “on demand” throughout the school day, particularly during instruction. The most

recent national count of computers in public schools, as reported by the U.S. Department of Education, shows a ratio of 3.8 to 1 for the number of students sharing an instructional computer with Internet access (Wells and Lewis 2006). Although this is a reduction from the 4.4 to 1 ratio reported in 2003, a closer examination of the ratio reveals that the Department of Education made no distinctions between computers in the classrooms and those in school technology labs, and all computers used for “instructional purposes” in the school were counted whether or not they were available for students’ use (Wells and Lewis 2006). Moreover, the ratio does not adequately

represent the distribution of computers across districts, schools, and classrooms, whereas the present study notes large disparities across a variety of demographic factors.

The data from the present study are offered as a more accurate gauge for the status of classroom technology, as described by a nationally representative sample of educators (i.e., classroom teachers and instructional assistants) reporting on their individual classrooms and professional experiences. In the present study, the vast majority of educators reported having five or fewer computers in their classrooms (or primary work areas) for students’ use, and more than half reported having no more than two computers in their classrooms.

Other studies using similar methods to gauge computer access show similar results. For example, the Technology Inventory results released annually by the Maryland State Department

For technology to become a reliable tool for teaching and learning...educators and students must have adequate access to computers inside the classroom.

of Education (2007) show, on average, that only 10.06 percent of classrooms had five or more computers, with county averages ranging from 0 percent to 33.6 percent.

In the present study, differences in the numbers of classroom computers are not notable across the different community types (i.e., urban, suburban, rural/small town) or based on educators' years of job experience. However, the study shows that elementary schools were likely to have more computers in the classrooms, whereas secondary schools were likely to have more computers in school technology labs. Furthermore, only one-third of all educators reported their schools' technology labs had more than 30 computers. Most schools had smaller labs, likely requiring some students to share computer access in the lab or limiting the number of classes that could use the lab simultaneously. Although most educators felt that they had enough technology to do their own jobs effectively, one-half still believed that access to computers for students in their classrooms was not adequate. Most educators in this study, as well as in other studies, consistently reported that the classroom was not the main location in the school where their students used computers (Consortium for School Networking 2004).

To help supplement classroom computers, nearly half the educators in the present study reported that they did have access to extra computers, such as laptops, to bring into their classroom on a short-term basis when necessary. Yet, this report shows later, newer educators, as well as educators in elementary and nonsuburban schools, were less likely to have such access to extra laptops for their students (see Figure 38 further below). Although nearly one-third of the educators in this study reported that their schools provided them with their own laptop for use at school and to take home, other national studies show that only 10 percent of public schools loaned laptops to students to take home (Wells and Lewis 2006). Student laptop initiatives are under way in districts such as Henrico County Public Schools, Richmond, VA (Apple Education 2007a), where every middle school and high school student receives a laptop computer, and in Sedgwick, Kansas (Apple Education 2007b), where iBook laptops are issued to every junior and senior in the district. School officials in Kansas insist the laptop programs not only help low-income students to gain access at home but also create an "engaged, interactive and constructionist position for learning." Efforts in urban schools such as San Francisco, CA (Apple Education 2007c); Kansas City, KS (Nagel 2007); and New Haven, CT (Delisio 2005) are particularly noteworthy, because more than half of the children 10–17 years old in households earning less than \$15,000 reportedly use computers at school but not at home, compared with only 6 percent of children in households earning more than \$75,000 (NSF 2004).

In addition to laptops, wireless technologies can provide schools with even more portability and connectivity, and districts across the United States are beginning to convert their schools and classrooms. For example, Charles County Public Schools in Maryland have created a wireless network in the entire district, and they have digitized the textbooks in the core subject areas (Hoffman 2007). School officials say they now can make more effective use of their resources, time, and school space.



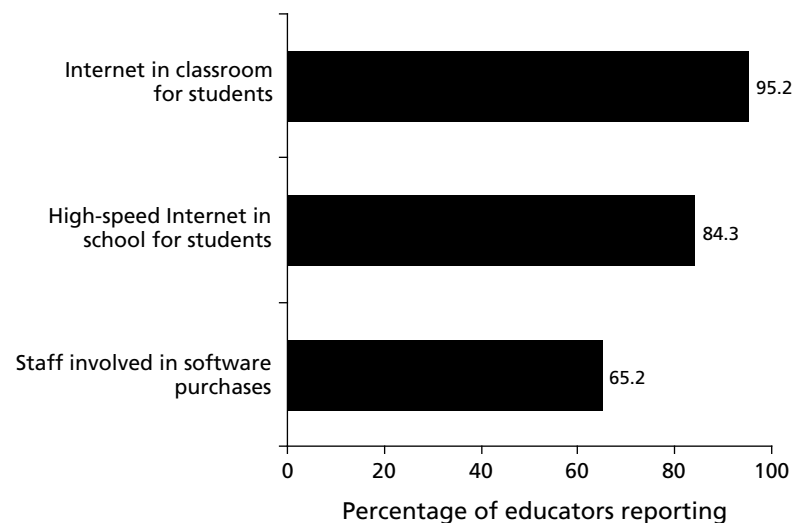
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Findings on Internet, Software, and Technical Support

Finding 3: Access to the Internet and instructional software at school was adequate for most educators, but technical assistance and support in using the equipment and software were often inadequate.

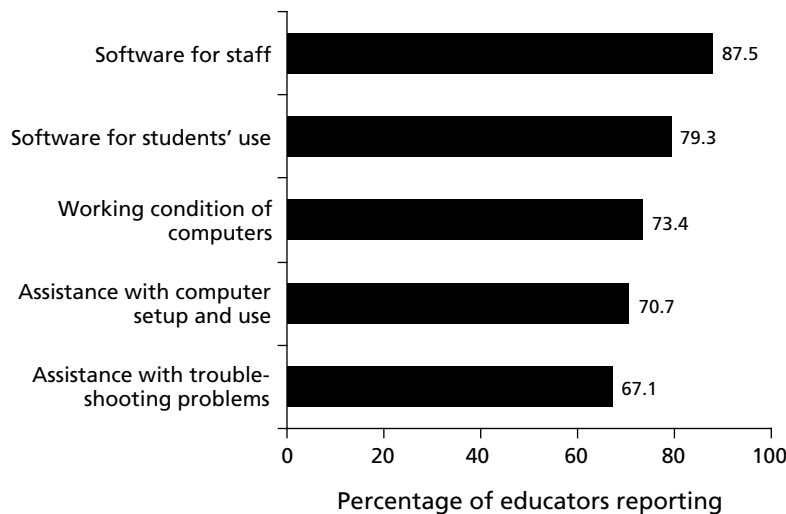
Almost all (95.2%) educators reported having Internet access in their classrooms, and the vast majority (84.3%) indicated that their students had access to high-speed Internet connections somewhere in the school building (Figure 6). Nearly two-thirds (65.2%) of the educators worked in schools where teachers and paraprofessionals helped make decisions about instructional software purchases.

Figure 6. Access to the Internet and Computer Software



More than three-quarters (79.3%) of the educators believed that the software for students' use was adequate, and the vast majority (87.5%) also believed that the software for teachers and other staff was adequate (Figure 7). Slightly fewer educators, however, felt the same optimism about the capacity and operation of the computer equipment. Fewer than three-fourths (73.4%) of educators considered the working condition of the computers in their schools adequate, and nearly the same percentage (70.7%) felt that technical assistance for setting up and using the technology in their school was adequate. Fewer educators (67.1%) felt that technical assistance for troubleshooting or fixing problems with the school technology was adequate.

Figure 7. Adequacy of Technology and Support (Response: “adequate or more than adequate”)



Discussion of Internet Access, Software, and Technical Support

The education rate (e-rate) fund, which Congress established in 1996 to assist schools and libraries with connectivity to the Internet, is credited with much of the success in bringing the Internet into nearly all school buildings in the nation (*Education Week* 2007). As a result of the e-rate, national reports show, there have been no differences in school access to the Internet by school characteristics since 1999 (Parsad and Jones 2005). However, upgrading schools to high-speed or broadband Internet service, which provides greater access to information and permits the use of multimedia, has been sporadic across schools and classrooms (Wells and Lewis 2006), particularly since the e-rate funds have declined (Trotter 2007).

As the present study reports, access to the Internet was adequate for the majority of the educators surveyed, with almost all having access to the Internet in their classrooms and at home. In addition, 8 of 10 educators reported that their students had access to a high-speed Internet connection somewhere in the school building. However, as this report shows later, demographic differences were apparent in educators' access to the Internet and software (see Figures 30 and 31 further below). Elementary educators were less likely to have a broadband connection and lagged by as much as 10 percentage points behind educators in secondary schools. They were also slightly less inclined to believe they had adequate software for their students' use.

The importance of age-appropriate software for students in the early grades is documented in other studies, which recommend that technology skills should be introduced and developed over time, throughout the schooling process. For example, Grand Rapids, Michigan, developed an integrative approach for teaching technology skills 10 years ago, whereby students began keyboarding and working with databases in elementary and middle school. By the time the students reached high school, they were expected to use these and other skills to prepare compositions and research papers, communicate, and solve problems (Mehlinger 1997).

Although schools have benefited from the influx of federal and private resources used to gain access to computer hardware and the Internet, the acquisition of educational software for lesson planning and preparation, as well as software to supplement textbooks and provide individualized instruction, has been largely left up to states and school districts to manage. Urban schools, in particular, which have the greatest reliance on e-rate funds, must seek other funding for the continuous acquisition and upgrading of computer software and other tools essential to using technology effectively for instruction. Urban educators queried for this study were much less likely than other educators to believe that their software for both students and staff was adequate, and they were less likely than other educators to be involved in making decisions about software purchases. Rural/small town educators were much more likely than urban and suburban educators to be involved in technology purchase decisions, and they were as likely as suburban educators to consider software adequate for students and staff.

Although the survey revealed that the working condition of computers was adequate in most schools, results shown later in this study document that educators in urban schools

Technical personnel trained to assist teachers with setting up and troubleshooting computers and other equipment are essential to the successful implementation of school technology.

had less reliable computers and the least amount of technical assistance (see Figure 20 below). As experts studying the problem have explained, maintenance capabilities as well as technical personnel make up a large part of any school technology budget and are often not considered during the initial planning and implementation phase of a technology plan (Borja 2007). Experts further agree that a major barrier to using technology in the classroom is the amount of class time required to set up and use computers and the planning time teachers need to create technology-based lessons (Bauer and Kenton 2005). Therefore, technical personnel trained to assist teachers with setting up and troubleshooting computers and other equipment are

essential to the successful implementation of school technology.

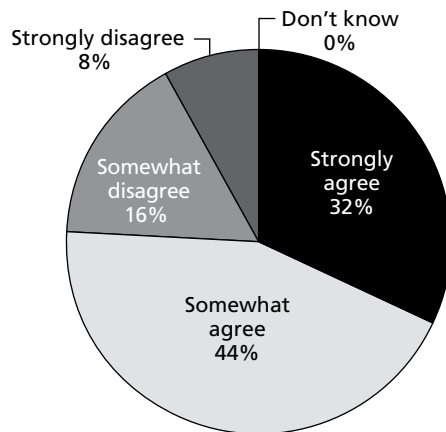
These conditions may help explain why schools in lower-income communities use technology differently, and for less constructive purposes, than schools in more affluent areas. Previous NEA studies on education technology issues found that educators in high-poverty schools are more likely to use technology for drill and practice activities, whereas those in low-poverty schools are more likely to use technology to vary instructional delivery (NEA 2004).

Findings on Technology Training and Effectiveness

Finding 4: School districts required professional development in technology for the majority of educators, but most educators believed that their training had been more effective for noninstructional tasks.

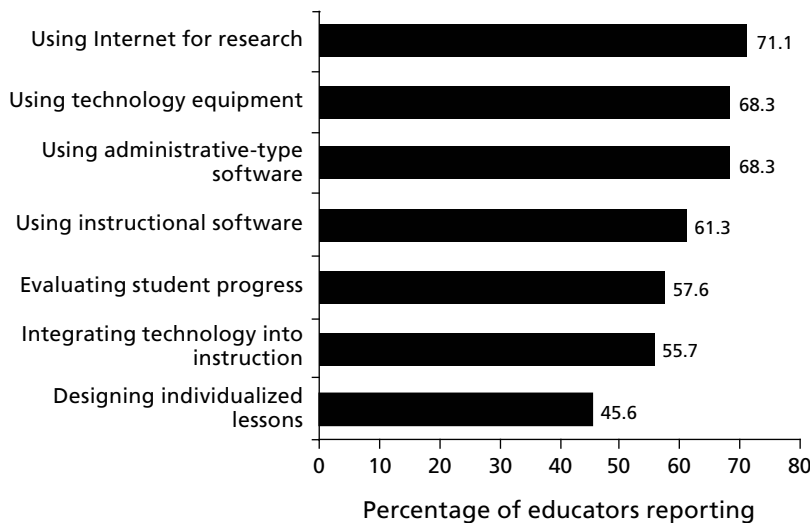
More than half (60.0%) of the educators reported their districts required them to participate in technology training, and more than three-fourths (76.4%) agreed that they were satisfied with their knowledge of how to use technology in their work (Figure 8).

Figure 8. Percentages of Educators Agreeing That They Were Satisfied with Their Knowledge of Technology for Work



About two-thirds of the educators surveyed reported that they had been adequately trained by their schools to use the Internet for research and information; to use technology equipment; to use administrative-type software (e.g., word processing, PowerPoint, graphics, and spreadsheets); and to use instructional software packages (71.1%, 68.3%, 68.3%, and 61.3%, respectively; Figure 9). However, fewer believed their training to use technology directly with students was adequate, such as for evaluating student progress, integrating technology into daily instruction, and designing individualized lessons (57.6%, 55.7%, and 45.6%, respectively).

Figure 9. Percentages of Educators Who Considered Their Technology Training Adequate (Response: "adequate" or "more than adequate")



Discussion of Technology Training and Effectiveness

The strengths of technology are centered around preparing educators to use alternative kinds of pedagogy—such as inquiry learning, models, and simulations, along with collaborative learning.

Although almost all educators in this study reported that their school district required technology training, that training appeared to be geared mostly toward administrative uses, research, and communications. Only slightly more than half of the educators felt that they had adequate preparation to integrate technology into instruction, and fewer than half felt prepared to use it for individualized instruction. As shown later in this report, educators in urban and rural schools were likely to feel less confident in their training to use technology (see Figure 22 further below), but those in middle schools seemed particularly satisfied with the training they had received to use technology (see Figure 32 further below).

Using technology as a tool for instruction should be part of quality induction programs for new educators and part of the ongoing professional development program in schools. Yet, the question of interest to most experts is, when and where should educators be trained to use instructional technology? A study commissioned by the Milken Family Foundation (2007) reported that 70 percent of some teacher education programs surveyed required three or more credits of instruction in information technology, but even most college faculty for the pro-

grams did not feel the training was adequate for student-teachers in their training programs. The Milken study went further to show that even with specific technology training, the highest levels of technology skills were found among student teachers who made use of technology on a routine basis throughout their teacher preparation program, as opposed to those who had heavy course requirements. As this report also reveals later, newer educators were less likely to believe their training to use technology in several areas was adequate, but they were still more likely to be satisfied with their overall knowledge and ability to use technology than the more experienced educators (see Figure 42 further below). Hope College, in Holland, Michigan, has a model approach to teacher preparation. For its program, the college's education department spent 10 years integrating technology into teaching and learning for students and professors. The college designed the program around the highest standards, whereby the International Society for Technology in Education (ISTE) provided a framework that was later aligned with the National Educational Technology Standards for Teachers (NETS*T; Cherup and Snyder 2003). Yet, even with standards for teacher education, a national report shows, only 19 states have requirements in place to ensure technology competency before issuing the initial teaching license (Bausell and Klemick 2007). That report also shows that 45 states have now established standards



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in technology for educators already working in schools, up from 34 in 2003, but only 9 states require teachers to demonstrate technology competency before being relicensed.

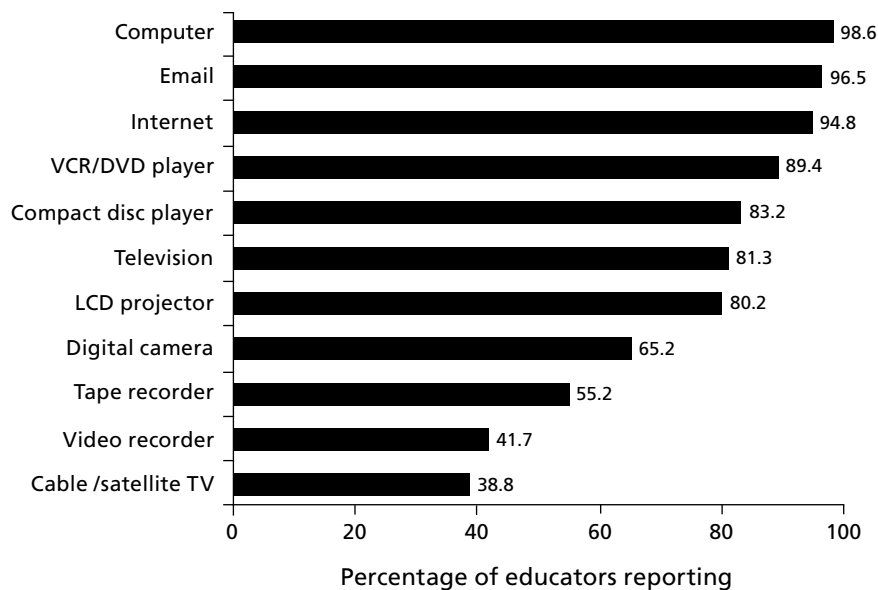
Experts studying trends in education technology suggest that the strengths of technology are centered around preparing educators to use alternative kinds of pedagogy—such as inquiry learning, models, and simulations, along with collaborative learning—that help students master higher-order thinking skills (Kavanaugh-Brown 2005). Experts further believe that when technology is only used for automating conventional teaching, as opposed to creating new ways to teach, it is only adding power to a marginal teaching approach. They further argue that technology is often viewed as ancillary, not integral, and anything viewed as ancillary will not lead to innovative changes in pedagogy (Trotter 2007). To achieve this innovation, therefore, we must ensure that all investments in instructional technology are matched with plans for classroom use and consistent professional development to empower teachers. Undoubtedly, instructional applications must be a priority in professional development for technology.

Technology Usage

Finding 5: Despite educators' limited access to technology training, computers and the Internet were the leading technologies used in public schools, rendering certain other types of technology nearly obsolete.

Almost all educators reported that they had used a computer, email, and the Internet at school within the past 12 months (98.6%, 96.5%, and 94.8%, respectively; Figure 10). The vast majority had used a VCR/ DVD player, CD player, television, and LCD projector (89.4% to 80.2%). Substantially fewer (65.2%) educators had used a digital camera at school. Only about half or fewer of educators had used other technologies, such as a tape recorder, video recorder, and cable or satellite TV (55.2%, 41.7%, and 38.8%, respectively).

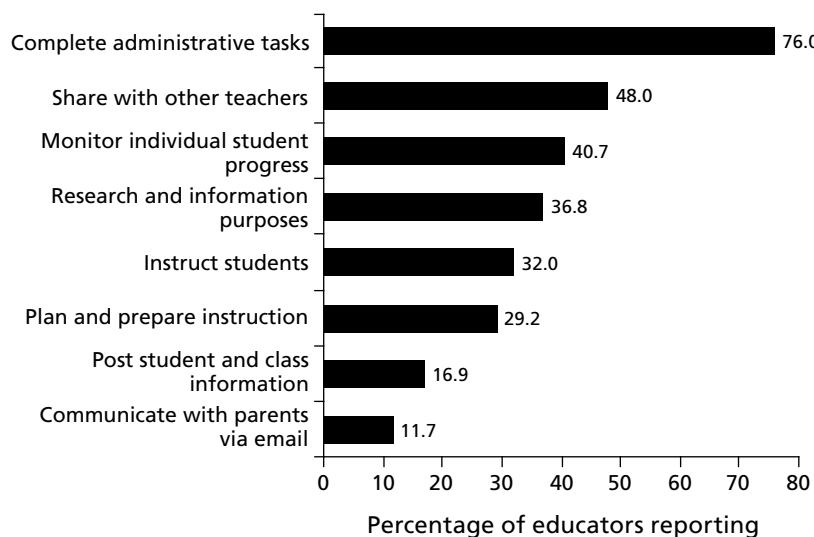
Figure 10. Technologies Educators Had Recently Used in School (Within the past 12 months)



Finding 6: Most educators used technology regularly at school for administrative tasks, but substantially fewer used it for instruction-related tasks.

Three-fourths (76.0%) of educators reported that they used technology at school daily to perform administrative tasks, and nearly one-half (48.0%) said they shared information or communicated with other educators daily (Figure 11). Fewer than half used technology daily to monitor student progress, for research and information, to instruct students, and to plan and prepare instruction (40.7%, 36.8%, 32.0%, and 29.2%, respectively). However, fewer than one-fifth of the educators reported using technology daily to post student and class information on the Internet or to communicate with parents by email (16.9% and 11.7%, respectively).

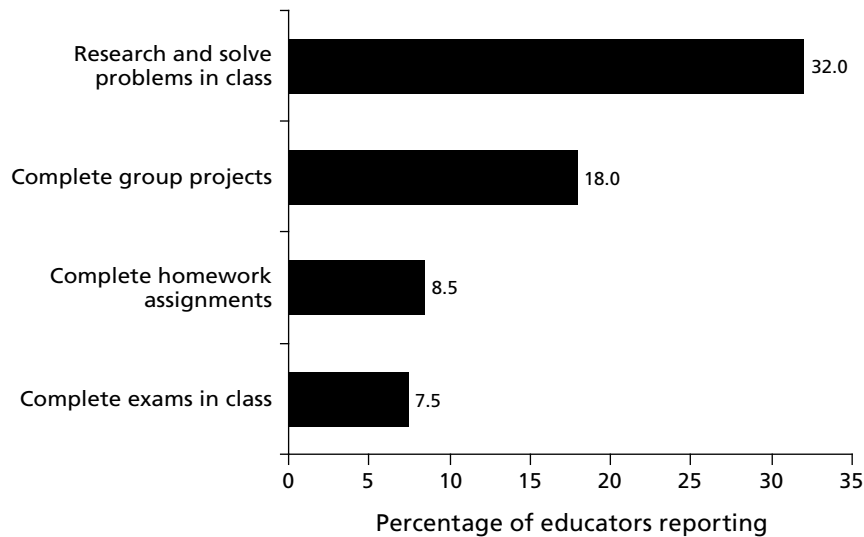
Figure 11. Educators' Daily Activities on Computers (Percentages reporting having conducted various activities)



Finding 7: About half of the educators required their students to use technology at school for individual research and problem solving, but only a few educators reported that they required their students to use computers regularly.

Only one-third (32.0%) of the surveyed instructional staff required students to use technology to research or solve problems in class at least a few times a week (Figure 12), and substantially fewer (18.0%) required students to use computers to complete projects together at least a few times a week. A few educators also required students to use computers to complete homework assignments and to complete exams in class at least a few times a week (8.5% and 7.5%, respectively).

Figure 12. Required Uses of Computers for Students (At least a few times a week)



Discussion of Technology Usage

For students to be adequately prepared to function in the global society of the 21st century, they should be taught using methods that have the greatest capacity to help them access and assimilate information. However, most educators in the present study reported using technology mainly for administrative tasks and for sharing information with other teachers rather than for instructional purposes. As the report shows later, educators have clear differences in use of technology based on their membership in different demographic groups. For example, newer educators were the most likely among the surveyed educators to use technology for instructional purposes (see Figure 44 further below); urban educators tended to use technology with less frequency than all other educators, even for administrative tasks (see Figure 24 further below); educators in senior high schools were more likely than those at other levels to require students to use computers for group projects or to do research and problem-solving in class; and educators at the elementary and junior high levels were less likely to require their students to use technology for either class work or homework (see Figure 35 further below).



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Of the 48 states with technology standards for students, only 4 test students on their knowledge of technology (Bausell and Klemick 2007). Some experts attribute the lack of technology use to the inequities or gaps in home-computer access, which make teachers slow to adopt approaches that put some students at a disadvantage. Other experts have suggested that some educators are reluctant to use technology because it allows

Full integration of technology into teaching and learning will require a systemic and balanced approach that goes beyond the acquisition of hardware and the use of computers only for research and information.

students to upend traditional classroom dynamics by having more expertise than their teachers have (Gewertz 2007).

Regardless of why educators do not require students to use technology, advocates for 21st-century skills stress the importance of literacy in information and communications technology (ICT) for performing learning skills, such as thinking and problem solving, communicating effectively, and enhancing self-direction and productivity. The Partnership for 21st Century Schools, an alliance of several major companies and organizations, including the National Education Association, firmly believes that the formula for developing ICT literacy includes good leadership; a strong technology infrastructure; adequate and equitable access to technology and the Internet in schools; integration of technology with classroom

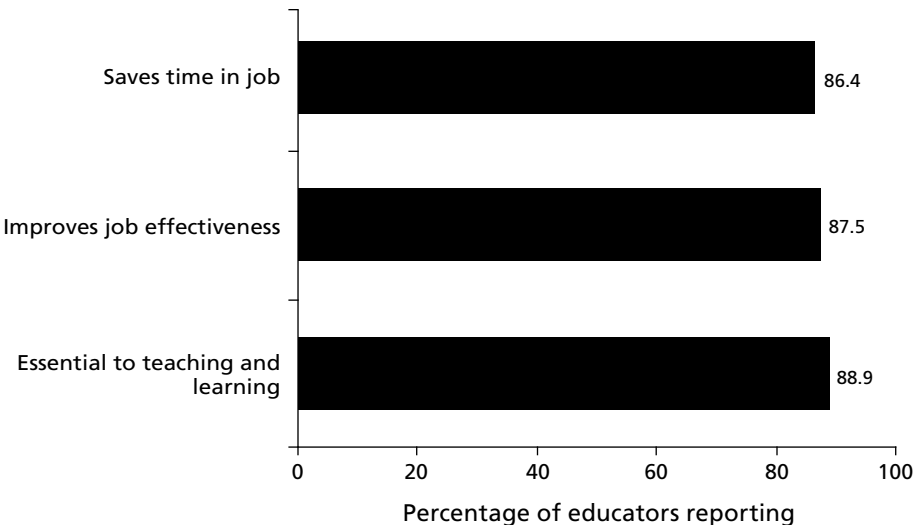
learning; and adequate methods for assessing ICT literacy (Partnership for 21st Century Skills 2002). Moving toward full integration of technology into teaching and learning will require a systemic and balanced approach that goes beyond the acquisition of hardware and the use of computers only for research and information.

Findings on Perceptions of Technology

Finding 8: Most educators surveyed were highly optimistic about the impact of technology on their jobs and on their students, and they considered technology essential to teaching and learning. Most believed that technology had improved their job effectiveness and had improved students' motivation for learning.

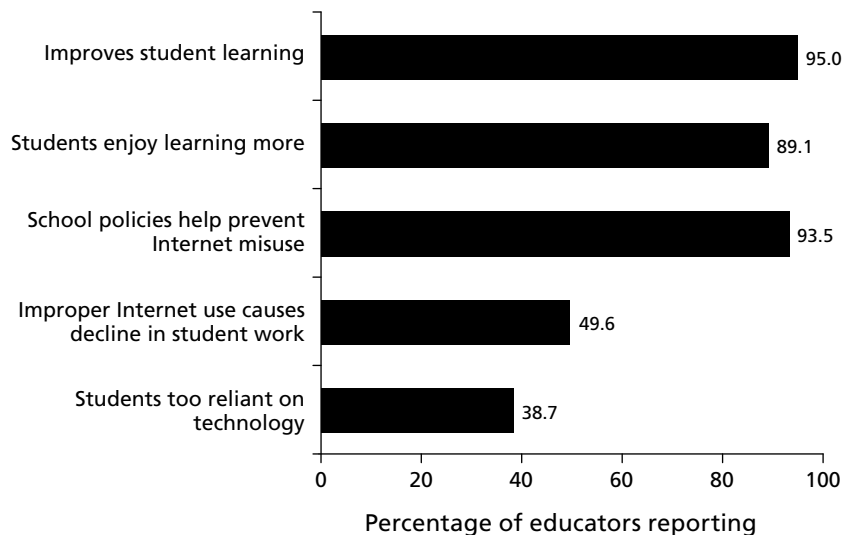
The vast majority (86.4%) of educators agreed that technology saved time in helping them do their job, and a similar majority (87.5%) agreed that technology had improved their overall effectiveness in their job. Moreover, an almost identical proportion of educators (88.9%) further considered technology as essential to teaching and learning (Figure 13).

Figure 13. Personal Perceptions of Technology among Educators



Nearly all (95.0%) educators agreed that technology, when used properly, improved student learning (Figure 14), and most (89.1%) also believed that their students enjoyed learning when using technology. Nearly all educators (93.5%) agreed that their schools' policies helped prevent inappropriate use of the Internet. Yet just under half (49.6%) still believed that students' improper use of the Internet had caused a decline in the quality of students' work. Slightly more than one-third (38.7%) of the educators felt that their students had become too reliant on technology.

Figure 14. Impact of Technology on Students as Educators Perceive It



Discussion of Educators' Perceptions of Technology

As the Clinton administration was preparing to leave office, the Office of Education Technology (2000) produced a second national school technology plan that called for more research on student learning and more evaluations of programs to help guide technology decisions at all levels of policy and instruction. However, when Congress passed the No Child Left Behind (NCLB) Act in 2002, with its large mandate for testing and accountability, it not only restructured the way school technology is funded but also shifted the focus of school technology spending toward improving school testing and data-analysis capabilities.

The climate for experimental endeavors and instructional usage thus shifted toward practicing for test-measured skills (Trotter 2007). Since the 2002 national policy shift, no policies have made a systematic or broad-scale effort to channel the resources and experimentation of states and districts toward using technology as an assistive learning tool in education to the degree that other fields and industries have used technology to enhance performance.

Despite funding and policy restraints, however, many states and districts have found the resources and opportunities to engage their schools and classrooms in a multitude of technology-enriched curricula and instruction and have demonstrated positive links to student achievement in a variety of subjects (Murphy and others 2002; O'Dwyer and others 2005). Although some achievement-related studies have raised more questions about the value of school technology than they have answered (Viadero 2007), most experts agree that the

Most experts agree that the motivational aspect of school technology engages and interests students and educators when technology is used in teaching and learning.

motivational aspect of school technology engages and interests students and educators when technology is used in teaching and learning. For example, seventh- and eighth-grade students in Maine who received laptops were more engaged and able to produce higher-quality work according to Silvernail and Lane (2007), and distance learning projects in several states (e.g., FL, VA, NY, NJ, and TX) fostered collaborative learning and student interest in science, according to Harouna and Keisch (2004). In the present survey, almost all educators agreed that technology improved student learning, but the vast majority also felt that their students enjoyed learning more with technology. As this report shows later, urban educators were particularly strong in believing that technology had a positive impact on students (see Figure 25 further below).

Enthusiasm for technology has led many school districts to alter not just the curriculum but also the way the curriculum is delivered. By recent counts, at least 23 states are now operating virtual schools, where students can receive instruction online (Robelen 2007). In Florida, almost 45,000 students in grades 6–12 take courses online from the Virtual School, and Michigan became the first state to pass a law mandating that graduating high school students have at least one “online learning experience.” Rural/small town schools are now able, using videoconferencing and the Web, to provide courses in subjects for which a local teacher is not available, and some districts are now able to offer services at home to some students with disabilities (Trotter 2007).

However, many educators believe that students still have not acquired the skills necessary to use technology appropriately. In the present study, nearly half the educators reported believing that improper use of the Internet had caused a decline in student work—a view particularly common among newer educators and educators at the senior high level. A recent study conducted by the Educational Testing Service (Trotter 2007) showed that a large percentage

of college and high school students lack the basic skills to conduct proper Web searches, and more than half could not accurately judge the objectivity of a Web site. Scholars in the field point out that rather than just knowing how to use technology, students must also know how to prioritize information coming through Web sites and email, how to think critically, and how to use multimedia to communicate (Viadero 2007).

Beyond its impact on students, technology also has important implications for the quality of the work experience for educators. Educators in this survey had generally positive perceptions of technology, and, the report shows later, newer educators were more likely than their longer-tenured counterparts to be satisfied with their general knowledge of technology as well as the impact it had on



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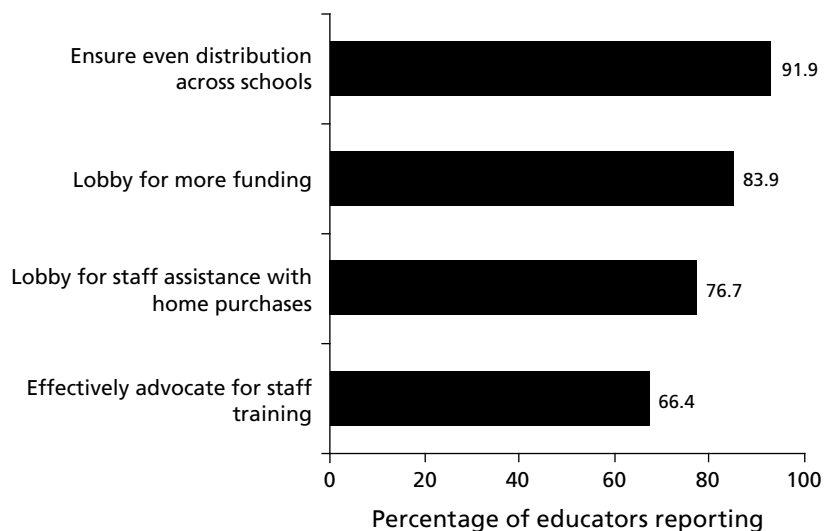
their job effectiveness. Although the vast majority of educators also agreed that technology was essential to teaching, results of this survey presented later show that educators in urban and rural/small town schools were more likely to agree “strongly” about the value of technology (see Figure 25 further below). Other studies also show that when educators use technology they feel they work more effectively and handle administrative tasks more efficiently (NCES 2000).

Findings on Union or Education Association Involvement

Finding 9: Educators asserted that their unions or education associations should be more involved in advocacy for technology, particularly regarding increased funding and more equitable distribution of technology in schools.

Almost all educators surveyed (91.9%) wanted their education association or union to help ensure that technology is evenly distributed across all schools for students (Figure 15), and the vast majority (83.9%) felt that their union should lobby for more technology funding in schools. Two-thirds (66.4%) agreed that their union was doing a good job of advocating technology training for educators, but even more (76.7%) felt their union should lobby for financial assistance to help educators purchase computers for home.

Figure 15. Role Educators Desired Their Union to Play in School Technology



Discussion of Union or Education Association Involvement

Most educators participating in the present survey wanted their unions or education associations to be involved in school technology issues, particularly regarding increasing technology funding and achieving a more equitable distribution of computers across schools. Although the Federal Communications Commission (FCC) and Congress are considering new ways to restore funding for the e-rate to cover Internet connectivity (Trotter 2007), it is still vitally important for states and districts to seek additional resources. This is because states and districts need additional funds to cover costs of connectivity, as well as hardware and software, which have never been covered by the e-rate fund. Unions and education associations need to work closely with school leaders to help develop and implement the leadership vision required to sustain technology funding. As this report shows later, support for union involvement in technology issues is strongest among urban

Unions and education associations need to work closely with school leaders to help develop and implement the leadership vision required to sustain technology funding.

educators (see Figure 26 further below), elementary school educators (see Figure 36 further below), and newer educators (see Figure 46 further below).

A recent study of school districts undertaken by the Consortium for School Networking (2004) found that when schools were committed to having technology, they devised ways to raise or “repurpose” budgets to maintain or even increase their level of support for technology—even in difficult budget cycles. Districts whose technology budgets had increased over the past three years spent almost twice as much per student every year on technology—causing an even wider gap for students in digital access—and were the most optimistic that their budgets would continue to increase. The Consortium study found that positive attitudes and a strong commitment to technology were the deciding factors in technology budgeting. Numerous examples of states giving education technology major roles in education policy and school reform initiatives are encouraging. Both Pennsylvania and Virginia recently passed legislative initiatives that tie school reforms to technology (*Education Week* 2006).



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3

Findings on Educators' Demographic Differences in Education Technology

The data compiled in this survey were further examined by particular demographic characteristics to discern differences in technology access, usage, and impact on educators and students. Differences are reported by school community type (i.e., urban, suburban, and rural/small town); school level (i.e., elementary, junior/middle, and senior high); and level of educators' work experience in education (i.e., 0–10 years for early career; 11–20 years for middle career; and more than 20 years for late career). In this report, only those issues where at least two groups differed by 5 or more percentage points are presented.

Findings by School Location

Finding 10: The number of computers in the classrooms for students' use did not differ substantially by school location, but the software, technical support, and condition of the equipment in urban schools was more likely to be inadequate.

The survey found only slight differences between urban, suburban, and rural/small town schools in the numbers of computers in classrooms for students' use (Figure 16). However, suburban educators were more likely (51.2%) to have additional computers, such as laptops, available to bring into the classroom on a short-term basis when necessary (Figure 17).

Figure 16. Number of Computers in Classrooms for Students' Use, by School Location

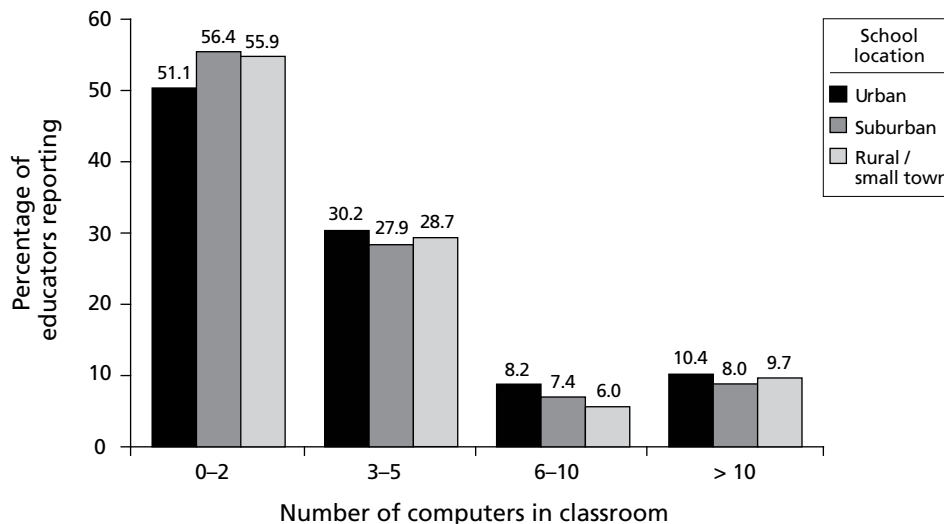
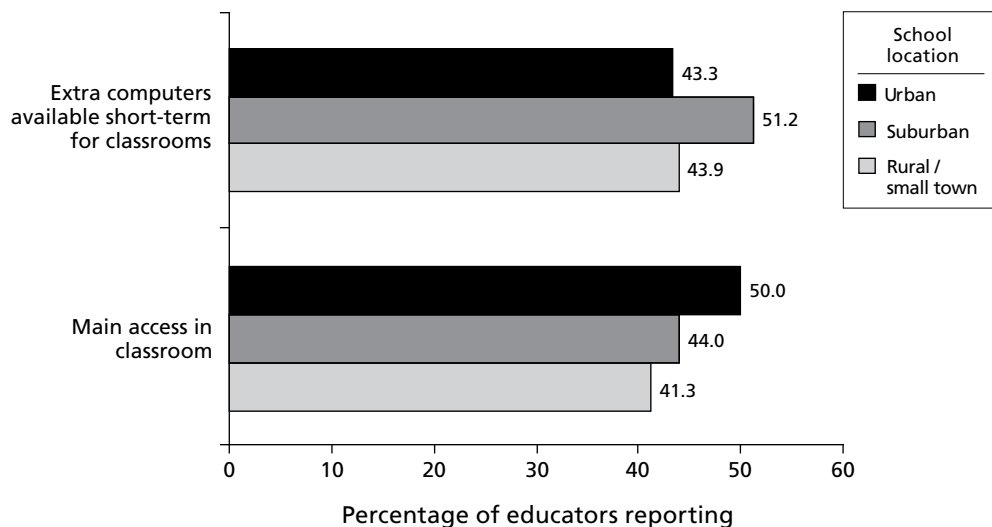
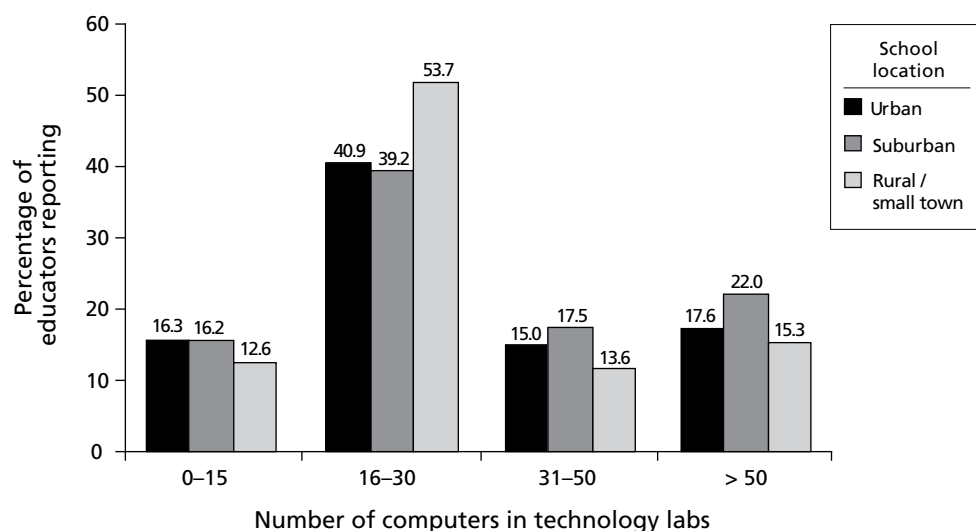


Figure 17. Classroom-Centered Computer Access, by School Location

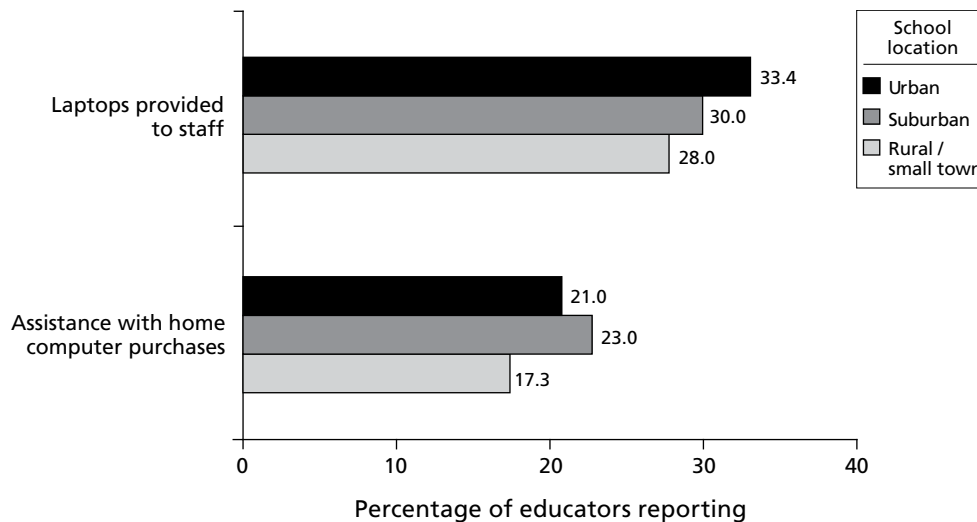
Educators in urban schools were more likely (50.0%) to say that their classroom or primary work area was the main location at school where their students used computers for class work (Figure 17), and they were more likely to have smaller technology labs for their students' computer use (Figure 18). Fewer than three-fourths (73.5%) of educators in urban schools reported having more than 15 computers in their technology labs, compared with 78.7 percent for suburban educators and 82.6 percent for rural/small town educators.

Figure 18. Number of Computers in School Technology Labs for Students' Use, by School Location

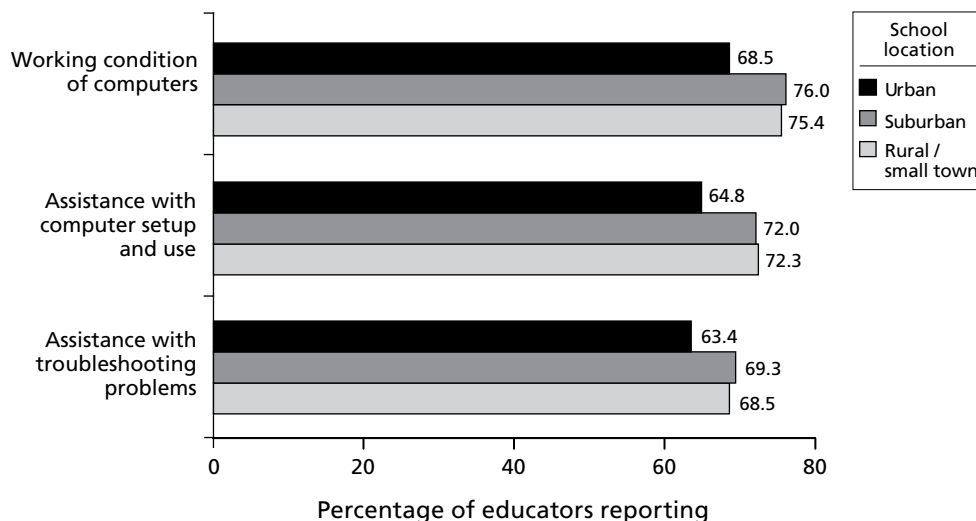
Finding 11: Whereas rural/small town educators were the least likely to receive support for their own personal technology, urban educators were more likely to have received a laptop computer for work purposes inside and outside of school, and they were as likely as suburban educators to have received assistance to purchase a computer for home.

Slightly more educators in urban schools (33.4%) received laptop computers for planning and instructional purposes inside and outside of school, whereas rural/small town educators were the least likely (28.0%) to have received laptops from their schools (Figure 19). Also, educators in rural/small town schools were less likely (17.3%) to have received assistance from the state or district to purchase computers for home use, whereas suburban educators were the most likely to have gotten such assistance.

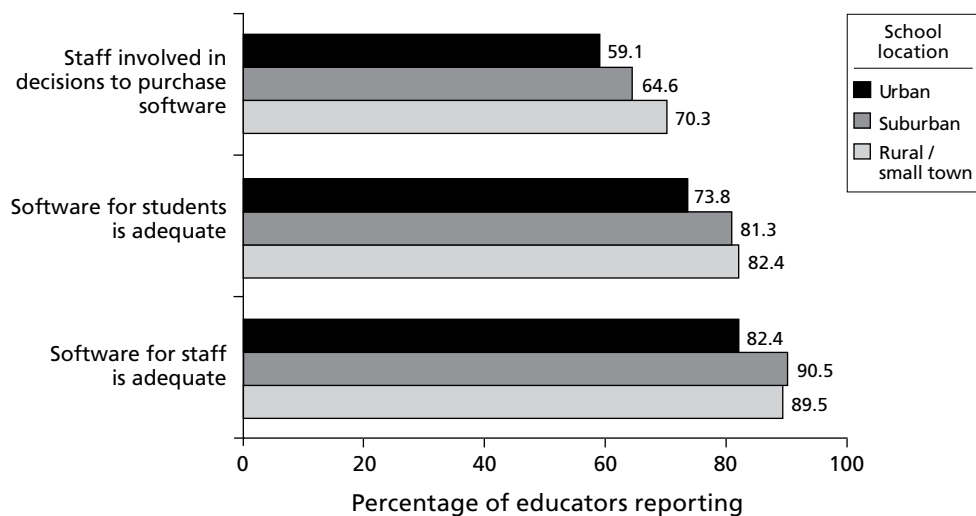
Figure 19. Technology Provided for Educators Outside of School, by School Location



Urban educators were less likely (68.5%) to have computers in adequate working condition and were less likely (64.8%) to have adequate technical assistance for setting up and using technology or for troubleshooting and fixing technology problems (63.4%; Figure 20).

Figure 20. Adequacy of Technology and Support, by School Location

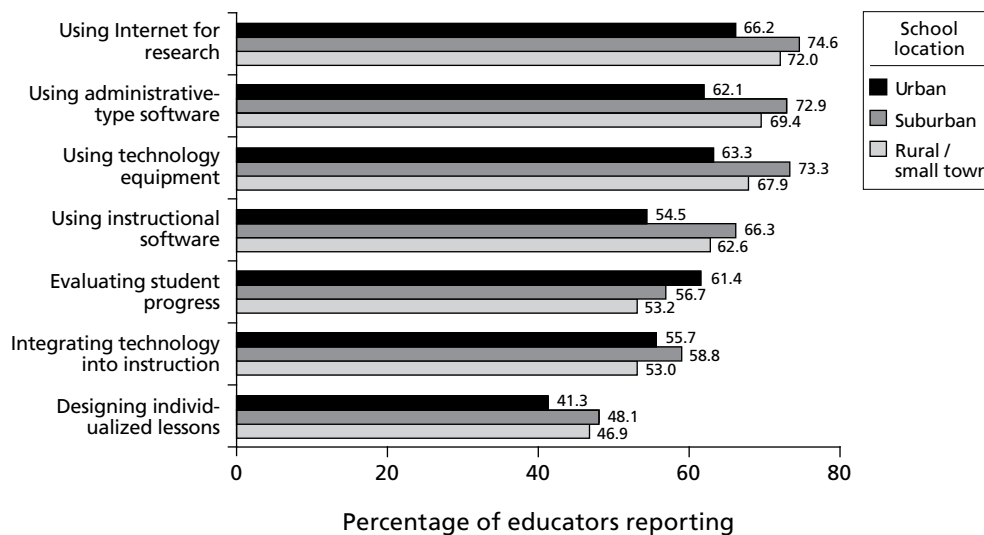
Urban educators were also less likely (59.1%) than other educators to have been involved in decisions about purchasing instructional software (Figure 21), and they were less likely (73.8%) to believe the software in their school for students' use was adequate or that the software for teachers and other staff was adequate (82.4%).

Figure 21. Access and Adequacy of Computer Software, by School Location

Finding 12: Urban school educators were the least likely of all educators to have received adequate training to use technology, particularly to use either administrative or instructional software and to design individual lessons for students.

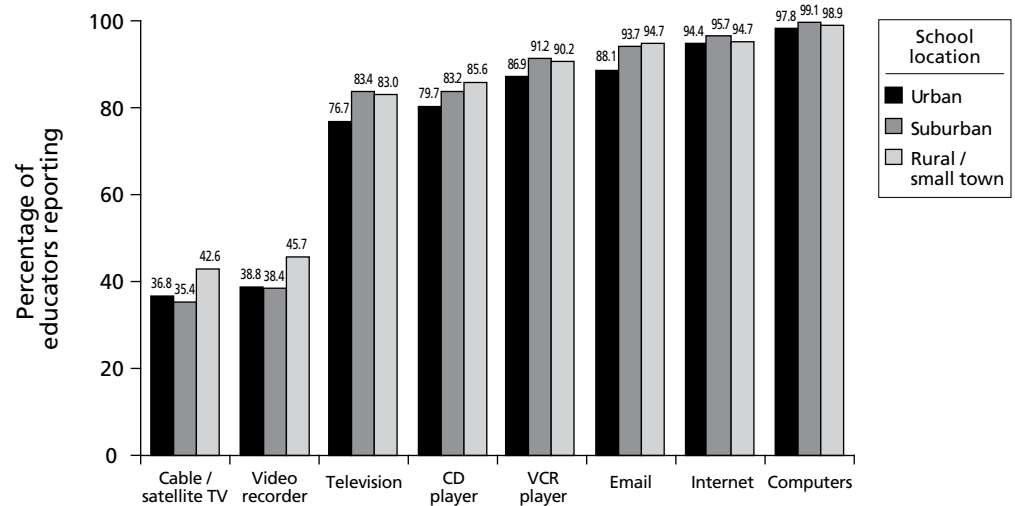
Urban educators were less likely to believe their training to use technology in a variety of ways was adequate (Figure 22). This finding related particularly to their training to use existing technology equipment in the school (63.3%), the Internet for research (66.2%), administrative-type software (62.1%), and instructional software (54.5%). Urban school educators were also less likely (41.3%) to feel trained to use technology to design individualized lessons but more likely (61.4%) to believe their training for evaluating students was adequate. Rural/small town educators were the least likely (53.0%) to believe their training to integrate technology into instruction was adequate.

Figure 22. Adequacy of Technology Training for Educators, by School Location

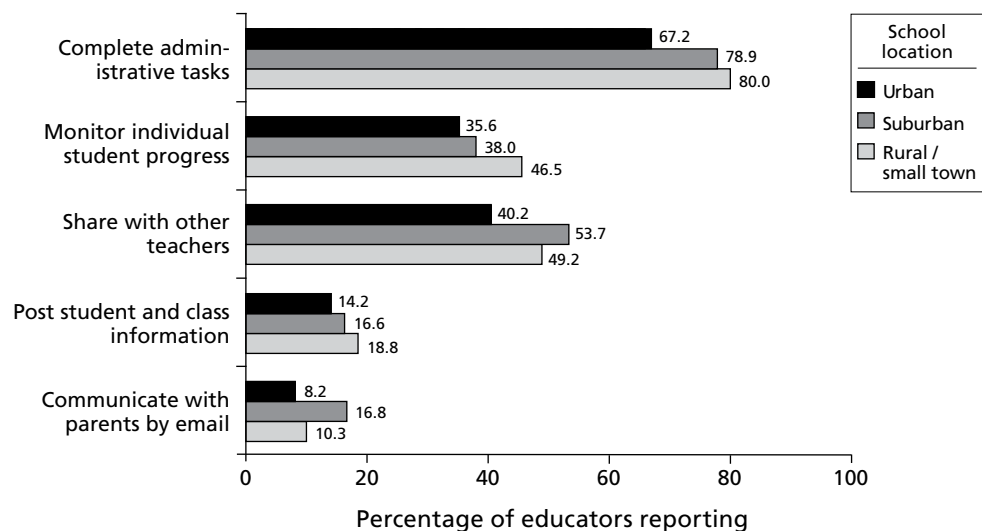


Finding 13: Educators in urban schools were less likely than other educators to have used technologies recently in school, apart from computers, the Internet, and VCR players, and urban educators tended to use computers with much less frequency than other educators.

Educators in urban schools were less likely than other educators to have used certain types of technologies at school within the past year, except for computers, the Internet, and VCR players (Figure 23). Educators in suburban and rural/small town schools used similar types of technologies, but rural/small town educators were more likely to use older technologies, such as video recorders and cable TV.

Figure 23. Technologies Recently Used by Educators in School, by School Location

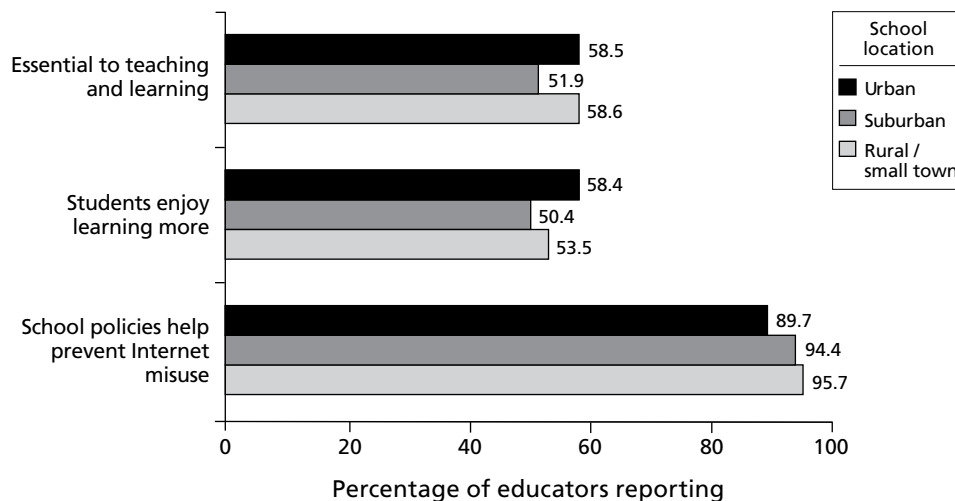
The survey found differences between educators in the frequency of their use of technology in school. Urban educators were much less likely to use computers daily in their jobs. They were less likely to use the computer every day for administrative tasks (67.2%) and for sharing information with other teachers (40.2%; Figure 24). They were also less likely (14.2%) than rural/small town educators to use the Internet daily to post student and class information. Both urban and suburban educators were much less likely (35.6% and 38.0%, respectively) than rural/small town educators (46.5%) to use technology for recording and monitoring individual student progress every day. Both urban and rural educators were less likely (8.2% and 10.3%, respectively) than suburban educators (16.8%) to communicate with parents by email.

Figure 24. Daily Activities on Computers by Educators by School Location

Finding 14: Urban and rural/small town educators were more positive than suburban educators about the impact of technology on teaching and learning; urban educators overwhelmingly believed their union or education association should help advocate for more technology in schools.

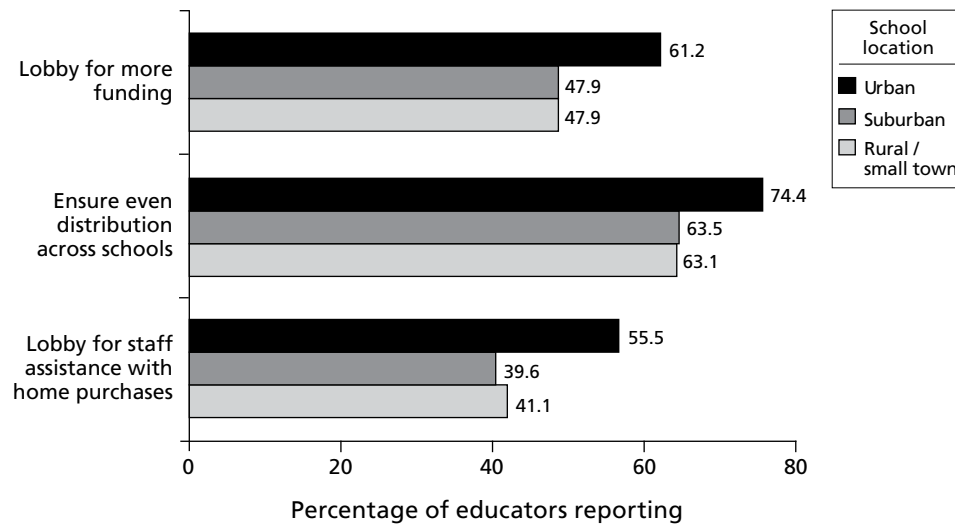
Educators in urban and rural/small town schools were more likely (58.5% and 58.6%, respectively) to agree “strongly” that technology was essential to teaching and learning, compared with those in suburban schools (51.9%; Figure 25). In addition, more urban educators (58.4%) felt “strongly” that their students enjoy learning when using technology. Urban educators were less likely (89.7%) to report that their school had policies and procedures that prevent inappropriate uses of the Internet than were their rural/small town counterparts (95.7%).

Figure 25. Educators' Perceptions of Technology by School Location



Substantially more educators in urban schools (61.2%) felt “strongly” that their union or professional association should lobby for more technology funding, and more urban educators (74.4%) felt “strongly” that their union should help ensure the even distribution of technology across all schools for students (Figure 26). Urban educators were also more likely (55.5%) to feel “strongly” that their union should lobby for financial assistance to help educators purchase computers for home.

Figure 26. Activities Educators Desired Their Union or Professional Association to Engage in Regarding School Technology, by School Location



Summary of Findings by School Location

Overall, the survey showed that adequacy of technology in urban schools fell well below that available in suburban schools and, to a large extent, below rural schools as well. Yet, although urban educators reported fewer laptops for students, smaller computer labs, less technical support and computer capacity, inadequate software, and less technology training, urban educators tended to be more optimistic about the value of technology for their students. Although both urban and rural educators were more likely than suburban educators to consider technology “essential” to teaching and learning, urban educators were more likely than all other educators to believe that technology motivated their students to learn. Urban educators were also much more likely than other educators to want their unions or education associations to become involved in school technology issues to help ensure more funding and more equitable distribution of technology across schools.

Findings by School Level

Finding 15: Educators in elementary schools had more computers in the classrooms for students’ use, whereas secondary schools were more likely to have extra computers available for short-term use in the classroom and to have larger school technology labs.

Although slightly more than half (52.5%) of educators in elementary schools had three or more computers in the classroom for students’ use, the majority of educators in secondary schools (67.4% and 60.1%, respectively, for junior/middle and senior high schools) had no more than two computers in their classrooms (Figure 27). In addition, more educators at the elementary level (52.3%) reported that their classroom was the primary location at school where their students used computers for class work (Figure 28). However, educators at the secondary school

level (50.7% and 48.7%, respectively, for junior/middle and senior high schools) were more likely to have additional computers available to bring into their classrooms on a short-term basis when necessary.

Figure 27. Number of Computers in Classrooms for Students' Use, by School Level

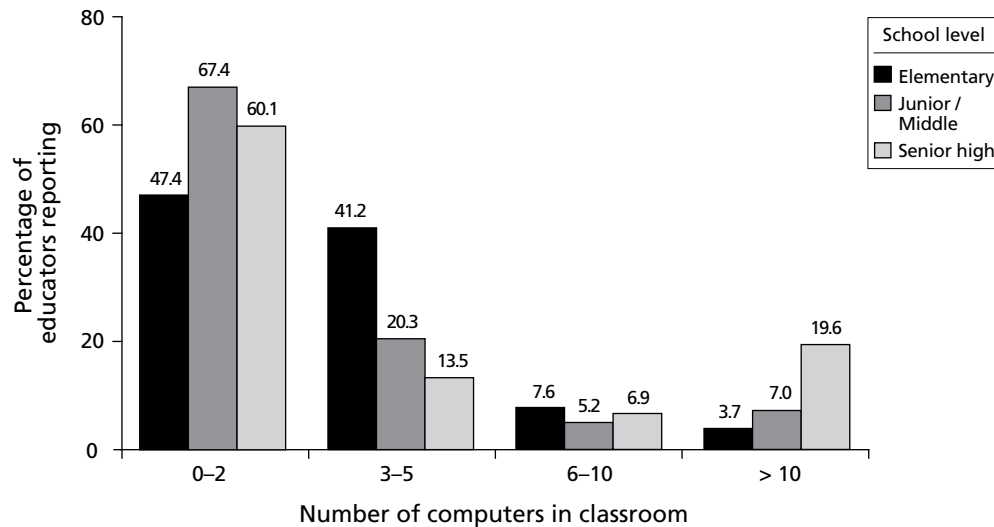
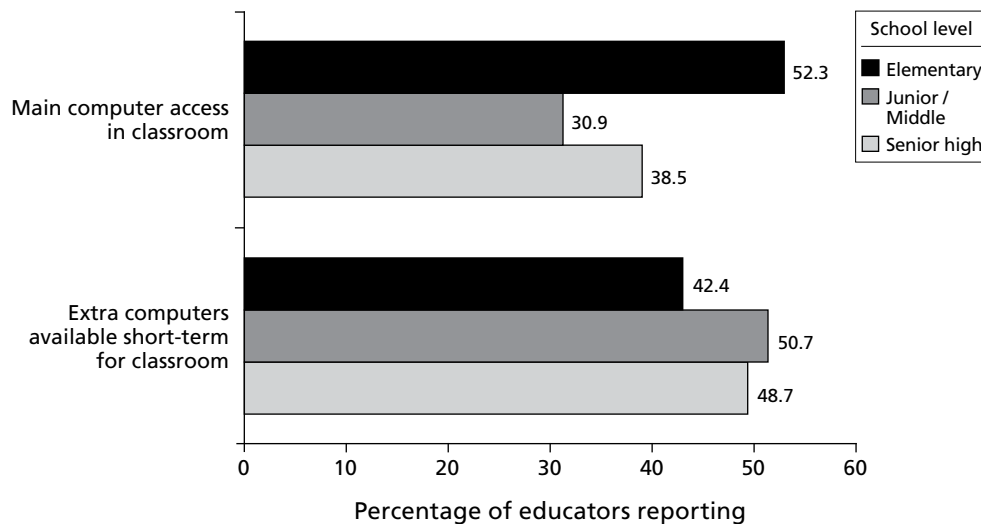


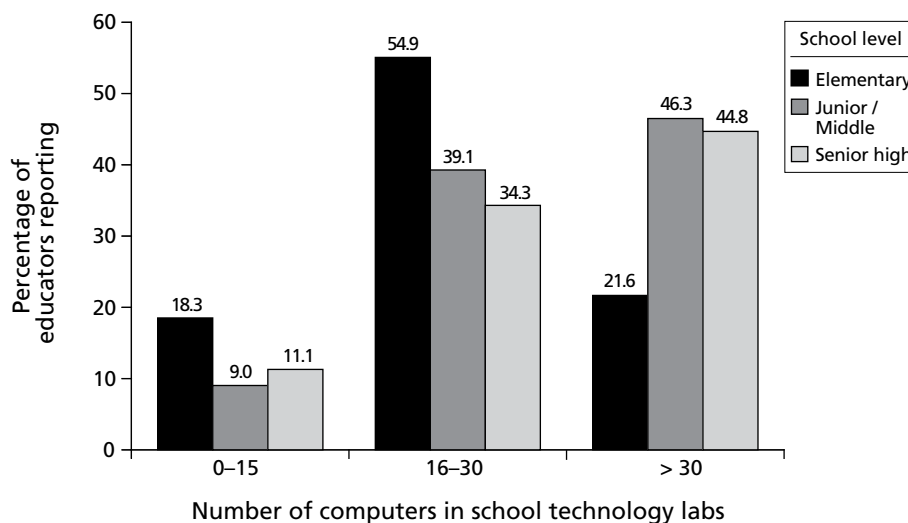
Figure 28. Classroom-Centered Computer Access, by School Level



Nearly three-fourths (73.2%) of elementary educators reported having 30 computers or fewer in the school technology labs, whereas educators in junior/middle and senior high schools were about evenly split between those with 30 computers or fewer (48.1% and 45.4%, respectively) and those with more than 30 (46.3% and 44.8%, respectively; Figure 29). Based on the

average size of classes, the smaller labs with 30 or fewer computers are less likely to provide adequate access for whole classes and even less likely to host multiple classes at a time.

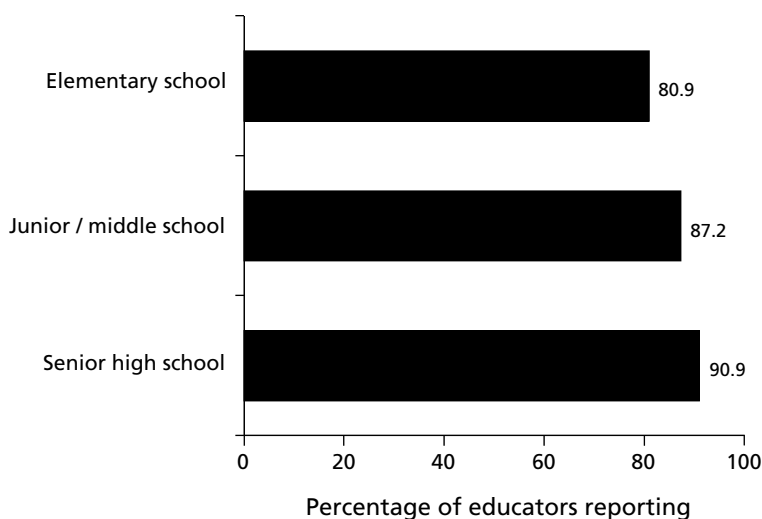
Figure 29. Number of Computers in School Technology Labs for Students' Use, by School Level



Finding 16: Educators in secondary schools were more likely than elementary educators to have access to high-speed Internet for their students and to be satisfied with the software for their students.

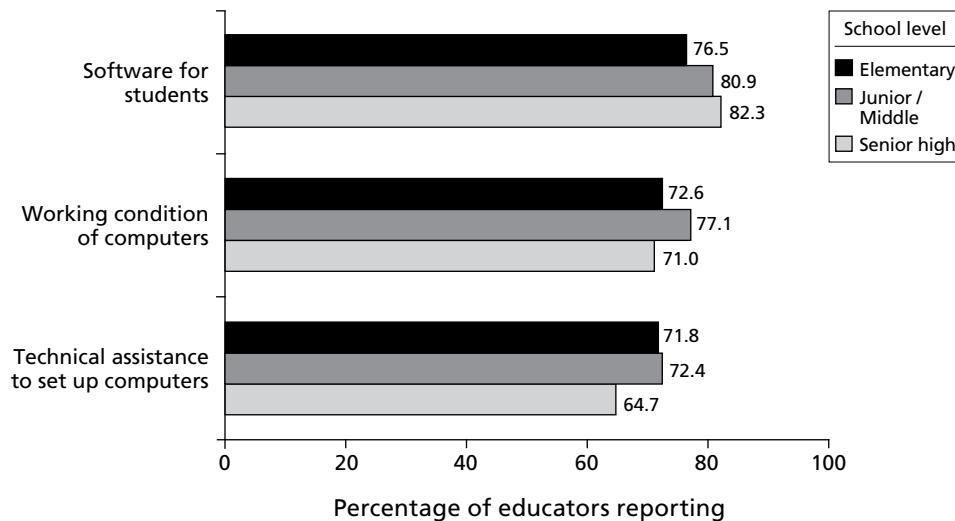
Substantially more educators in secondary schools (90.9% and 87.2% for high schools and junior/middle schools, respectively) had access to “high speed” Internet for their students some place in the school, compared with educators in elementary schools (80.9%; Figure 30).

Figure 30. High-Speed Internet in School for Students' Use, by School Level



Beyond the availability of computers, more secondary educators felt that their software for students was adequate (82.3% and 80.9%, respectively, for senior high and junior/middle schools; Figure 31). Also, educators in middle schools, in particular, felt the working condition of their computers was adequate (77.1%), whereas senior high educators were the least likely (64.7%) to feel they had adequate technical assistance in setting up and using technology in their school.

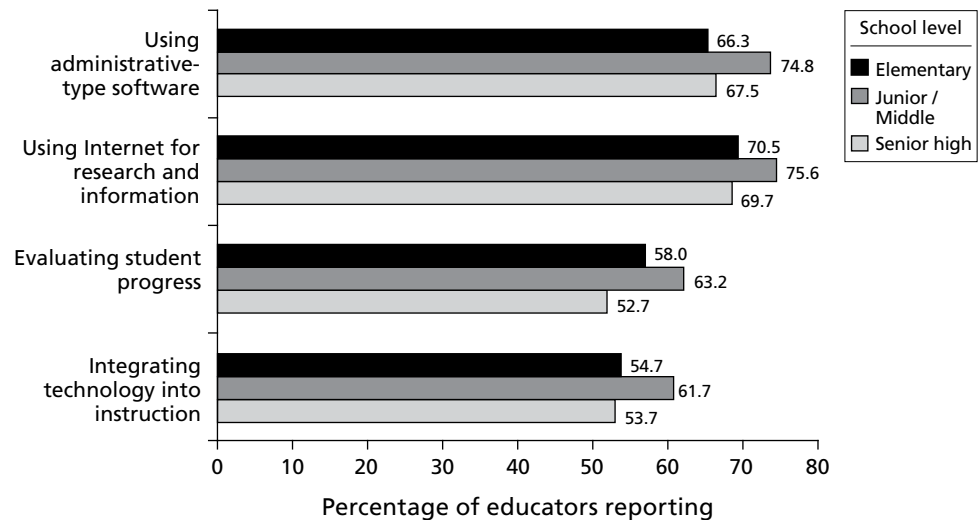
Figure 31. Adequacy of Technology and Support, by School Level
(Responses: "adequate" or "more than adequate")



Finding 17: Educators in middle schools were more satisfied with their technology training than educators at other school levels and tended to use technology at nearly the same level or at higher levels than educators in senior high schools. Educators at the elementary levels were more likely than secondary educators to use technologies other than computers and the Internet with their students.

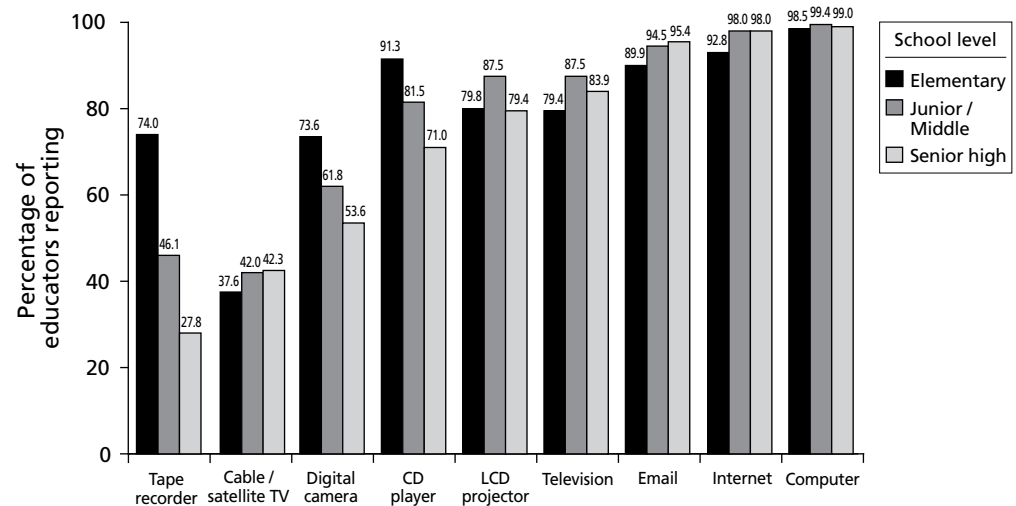
Middle school staff were more likely than senior high and elementary staff to feel their various types of training in using technology was adequate or more than adequate (Figure 32). Middle school staff were more likely to be satisfied with their training to use administrative-type software (74.8%); the Internet for research and information (75.6%); technology to evaluate individual student progress (63.2%); and to integrate technology into daily instruction (61.7%).

Figure 32. Adequacy of Technology Training, by School Level (Response: "adequate" or "more than adequate")



The survey discovered modest-to-substantial differences between educators' recent use of various types of technology at different school levels. More educators in the secondary schools used email, television, cable TV or satellite, and LCD projectors, whereas substantially more at the elementary level used tape recorders, CD players, and digital cameras (Figure 33).

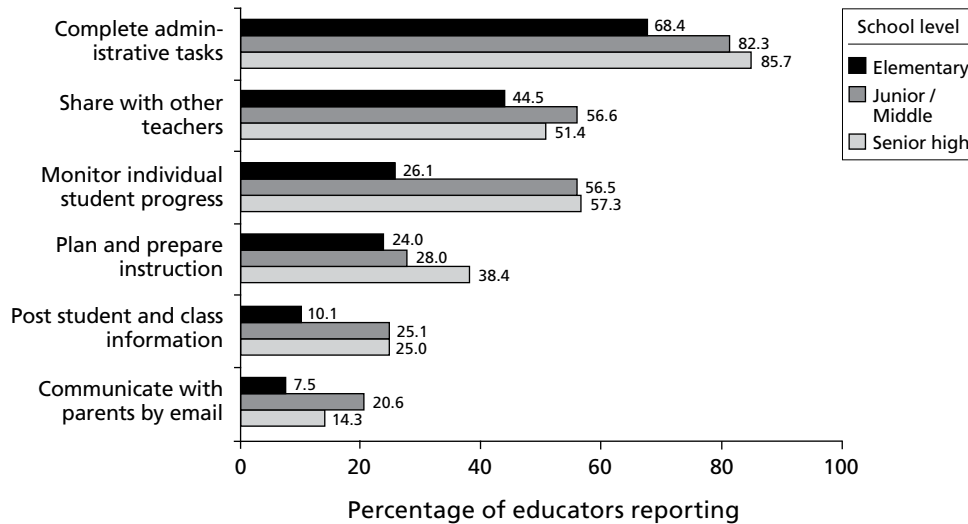
Figure 33. Technologies Educators Used Recently in School, by School Level



Substantially more staff at the secondary school level used technology daily to complete school administrative tasks (85.7% and 82.3%, respectively, for senior high schools and junior/middle schools); record and monitor individual student progress (57.3% and 56.5%, respectively, for senior high schools and junior/middle schools); share information or communicate with other teachers (51.4% and 56.6%, respectively, for senior high schools and junior/middle

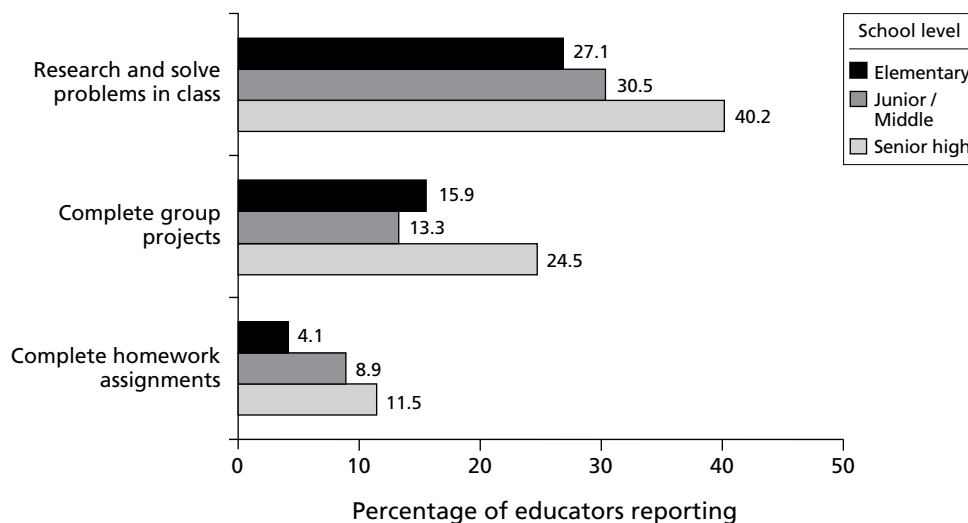
schools); post student and class information (25.0 and 25.1%, respectively, for senior high schools and junior/middle schools); and communicate with parents by email (14.3% and 20.6%, respectively, for senior high schools and junior/middle schools; Figure 34). In addition, educators in senior high schools were much more likely than other educators (38.4% vs. 28.0% for junior/middle schools and 24.0% for elementary schools) to use computers to plan and prepare instruction.

Figure 34. Daily Activities on Computers for Educators, by School Level



With regard to technology for students' use, senior high school educators were more likely than other educators to require students to use technology to do research and to solve problems at least a few times a week (40.2%); to complete projects together on the computer as a class or group at least a few times a week (24.5%); and to complete homework on a computer at least a few times a week (11.5%; Figure 35).

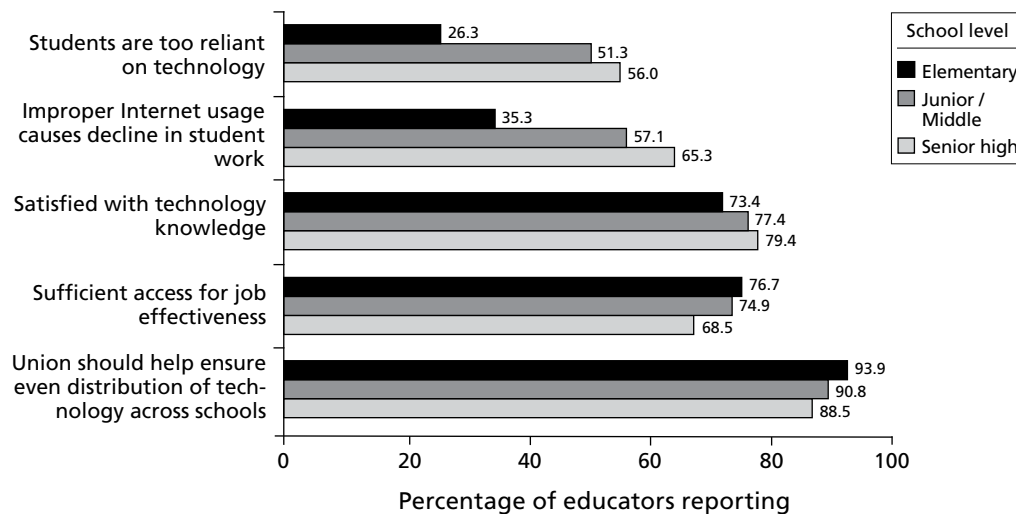
Figure 35. Required Uses of Technology for Students by School Level



Finding 18: Educators in secondary schools were less satisfied with their students' reliance on technology and with the impact of the Internet on students' work quality. Although they were also less satisfied with their own access to technology, they were somewhat less likely to want their unions or education associations to help advocate for equity in technology across schools.

Educators in secondary schools were more likely (51.3% for junior/middle and 56.0% for senior high schools) to feel students in their school had become too reliant on technology (Figure 36). Junior and senior high school educators were more likely (57.1% and 65.3%, respectively) to believe that improper uses of information on the Internet had caused the quality of student research to decline. In addition, junior and senior high school educators were also more likely (77.4% and 79.4%, respectively) to be satisfied with their own knowledge of how to use technology in their work. Yet, although fewer staff at the senior high level (68.5%) felt that they had sufficient access to the technology they needed to do their jobs effectively, they were the least likely (88.5%) to believe that their union or education association should help ensure the even distribution of technology across all schools for students.

Figure 36. Educators' Perceptions of Technology, by School Level



Summary of Findings by School Level

Overall, educators in elementary schools were likely to have slightly more computers in their classrooms, whereas secondary schools had larger computer labs, greater access to the Internet, and more adequate software for their students. However, educators at the junior high /middle school level tended to be much more satisfied with their technology training, particularly for integrating technology into instruction, but they were no more likely to use it for instructional purposes or to require their students to use it more than were educators at the elementary level. Educators at the senior high level tended to be more concerned about the negative effects of technology on their students' work, and although they were not as satisfied as other educators

with their own level of computer access, they were less inclined to want their unions or education associations to get involved to ensure more equity across schools.

Findings by Educators' Career Level

Finding 19: Educators with the most years of experience had greater access to computers for their students and for themselves, but educators with the fewest years of experience were as satisfied as the more experienced educators with their access to technology to do their own jobs.

Although the number of computers in the classroom did not differ markedly based on educators' years of job experience (Figure 37), educators with the most experience (late career) were more likely (50.0%) to work in schools that had extra computers available for their classroom on a short-term basis when needed (Figure 38). Late-career educators were also more likely (32.7%) to have a laptop provided to them that they could use inside and outside of school for planning and instruction. However, the least experienced educators, those in their early-career years, were just as likely as their late-career counterparts (75.7% and 75.9%, respectively) to believe that they had sufficient access to technology at school to do their jobs effectively. (*Note:* Educators with 10 or fewer years of experience are categorized as “early career” educators; educators with 11–20 years of experience are categorized as “middle career”; and educators with 21 or more years of experience are categorized as “late career.” For certain variables, educators at the “new career” stage, 0–5 years, differed notably from other early-career educators, and these findings are presented, as well, where significant.)

Figure 37. Number of Computers in Classrooms for Students' Use, by Educator Career Level

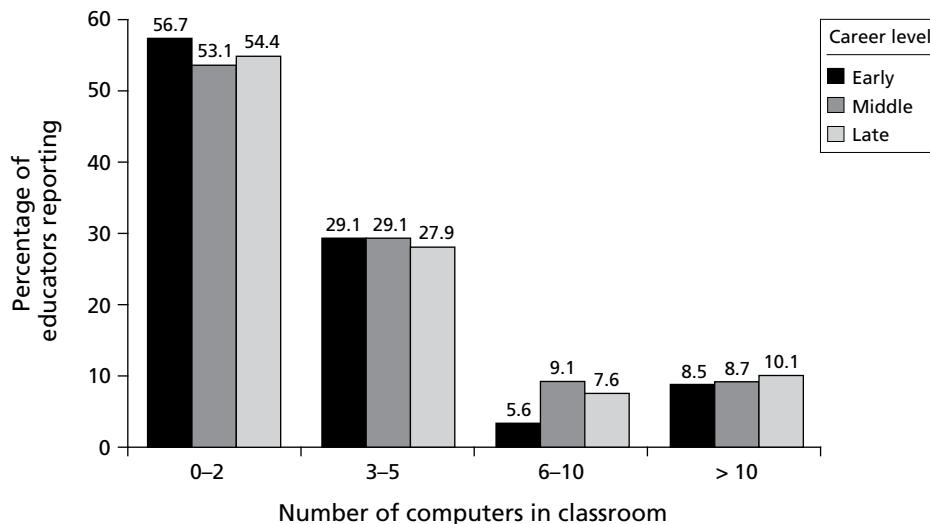
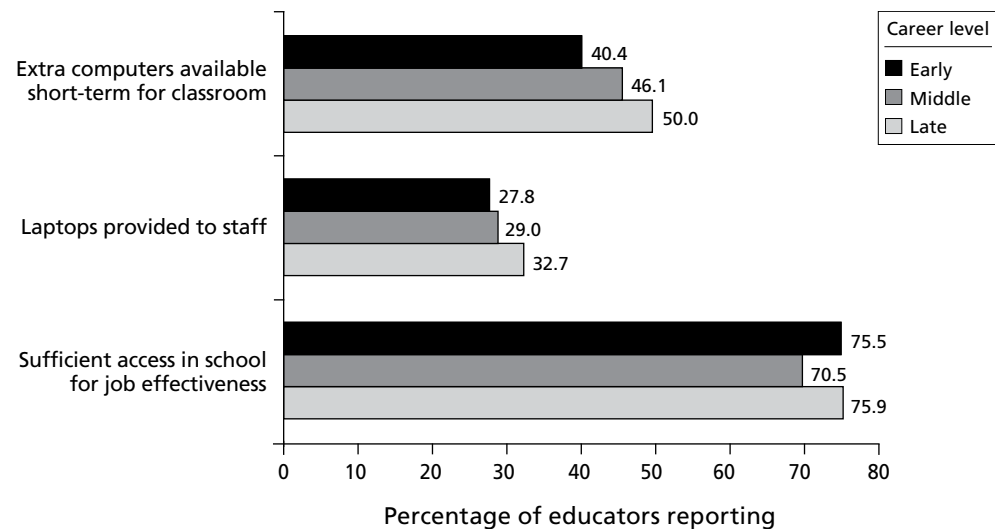
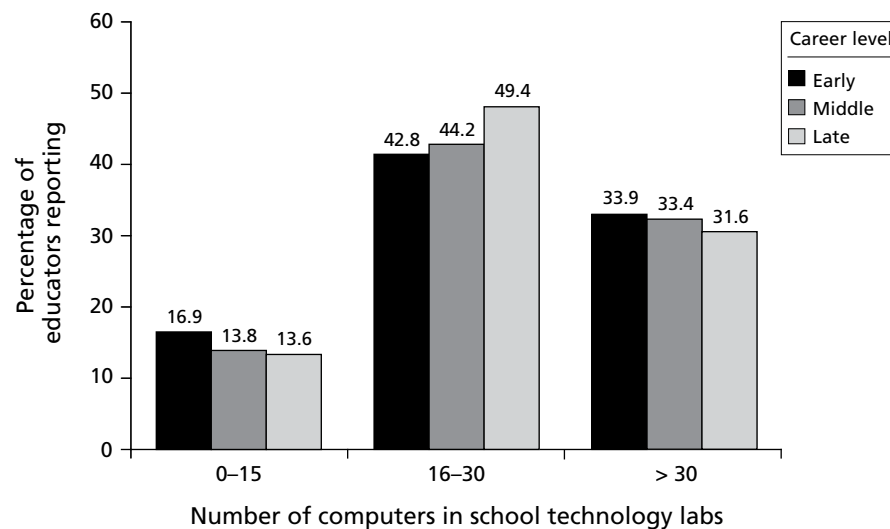


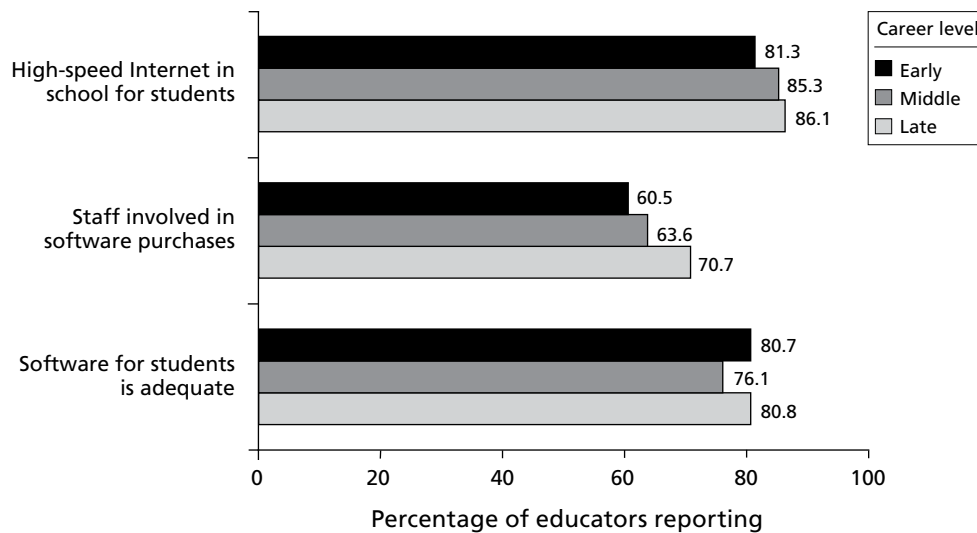
Figure 38. Access to Computers Inside and Outside School, by Educator Career Level

Late-career educators were more likely (81.0%) to work in schools that had large computer labs, with 16 to 30 or more computers for students (Figure 39), and their students were more likely (86.1%) to have access to a high-speed Internet connection in the school (Figure 40).

Figure 39. Number of Computers in School Technology Labs for Students' Use, by Educator Career Level

Late-career educators were also much more likely (70.7%) to report that staff members in their school were involved in decisions to purchase software for computers, whereas mid-career educators were the least likely (76.1%) to believe that software for their students was adequate (Figure 40).

Figure 40. Computer Software and the Internet for Students, by Educator Career Level



Finding 20: Educators with the most job experience were more likely to participate in required technology training and to believe their training was adequate.

Late-career educators were more likely (64.5%) to indicate that their districts or states required them to participate in technology training, followed by the very newest educators, who had five or fewer years of job experience (60.9%; Figure 41). However, late-career educators were much more likely than all other educators, especially the newest educators, to believe that their training in certain areas was adequate or more than adequate, particularly in using the Internet for research (74.9%), integrating technology into instruction (61.8%), and using administrative-type software (72.2%; Figure 42).

Figure 41. Technology Training Required by District, by Educator Career Level

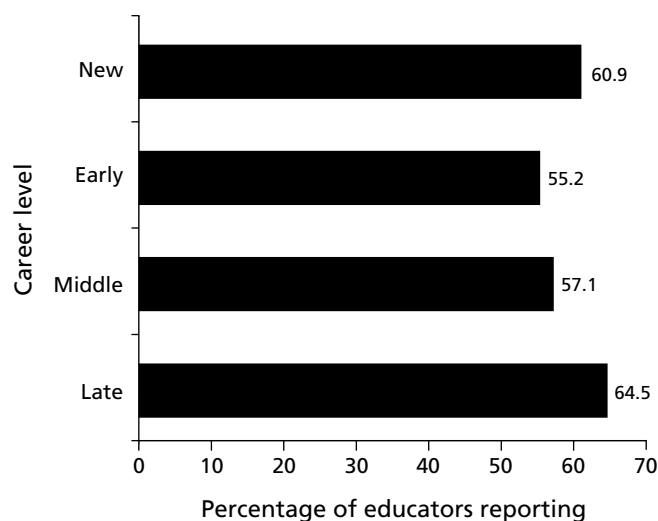
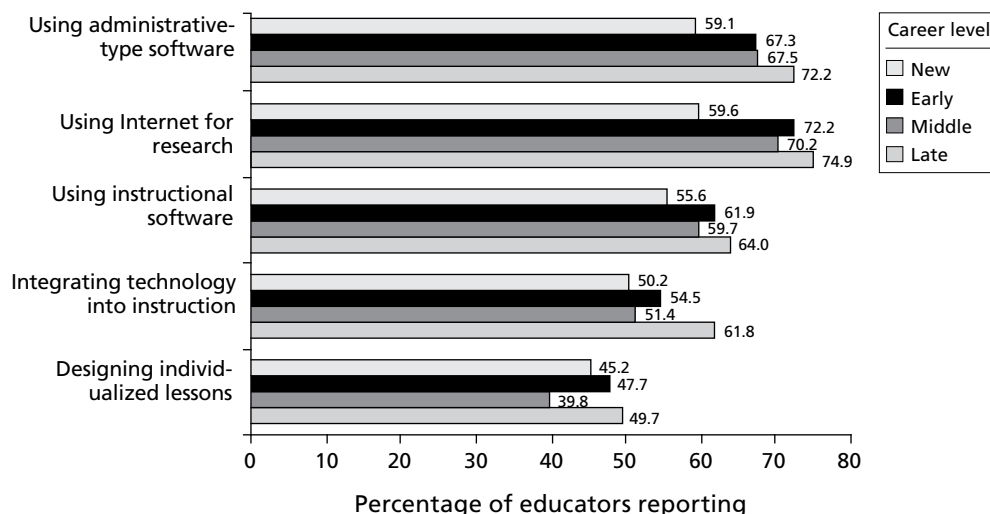


Figure 42. Adequacy of Technology Training, by Educator Career Level (Response: "adequate or more than adequate")



Finding 21: Educators with the least amount of job experience were more likely to use technology for instructional purposes and were more satisfied with their knowledge of technology and its impact on their ability to do their jobs.

Late-career educators were more likely to have used certain technologies at school within the past year, particularly the Internet and email (Figure 43). However, early-career educators were more likely (41.5%) to have used the Internet for research and information on a daily basis and were more likely (32.0%) to use technology to plan and prepare instruction daily (Figure 44).

Figure 43. Technologies Recently Used in Schools, by Educator Career Level

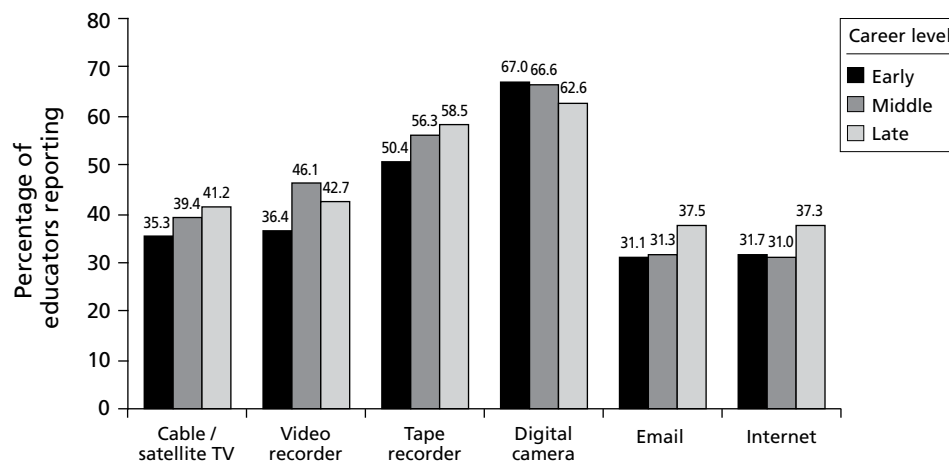
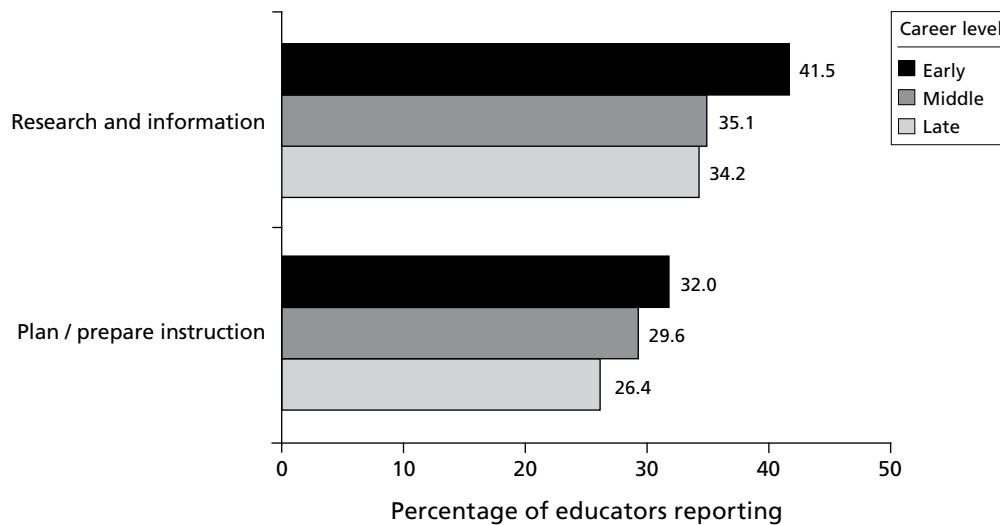
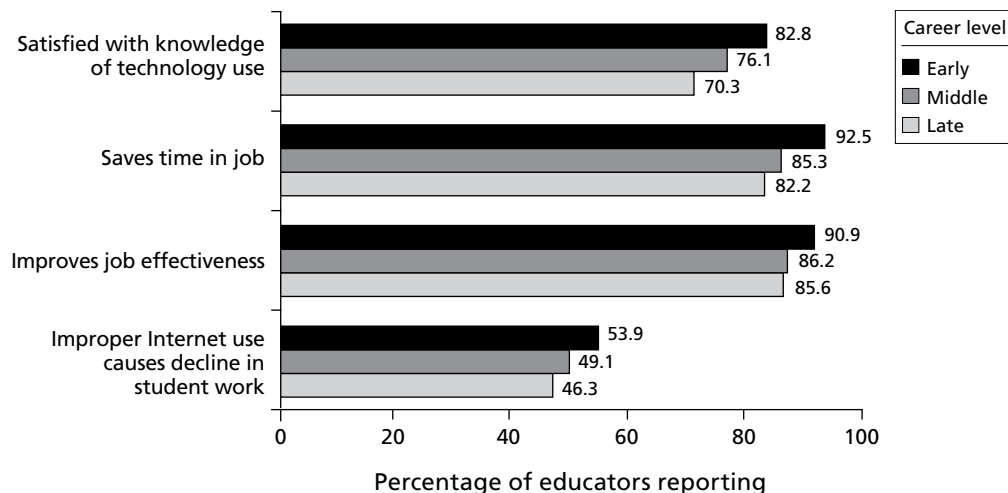


Figure 44. Daily Uses of Technology, by Educator Career Level

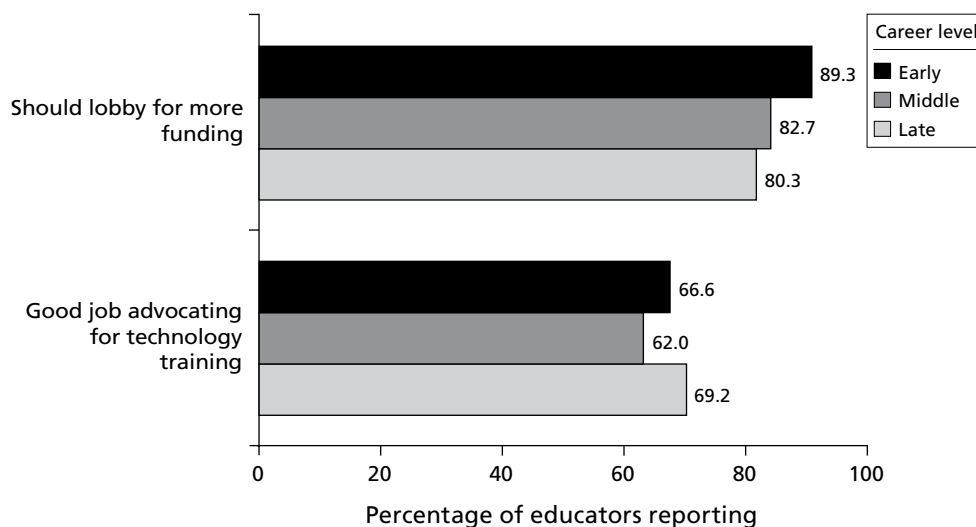
Early-career educators were much more likely (82.8%) to agree that they were satisfied with their knowledge of how to use technology in their work, more likely (92.5%) to agree that technology saved time in their job, and that technology improved their job effectiveness (90.9%; Figure 45). Early-career educators were also more likely (53.9%) than other educators to believe that improper use of information on the Internet had caused the quality of student research to decline.

Figure 45. Perceptions of Technology, by Educator Career Level

Finding 22: Educators with the fewest years of experience overwhelmingly believed that their unions or education associations should advocate for more technology funding, but mid-career educators were not as optimistic about the effectiveness of their unions' advocacy for technology.

Although educators overwhelmingly supported their education associations' or unions' involvement in advocating for technology, educators at the early-career stage were more likely (89.3%) than other educators to agree that their union or education association should lobby for more technology funding for schools (Figure 46). However, regarding past advocacy, educators at the mid-career stage were less inclined (62.0%) than others to agree that their education association had done a good job of advocating technology training for educators.

Figure 46. Educators' Views of the Union Role in School Technology, by Educator Career Level



Summary of Findings by Educators' Career Levels

Overall, educators with the least amount of job experience had less access to computers and the Internet for students and for themselves, and they were more likely to want their unions or education associations to lobby for more funding. Educators with less experience were also less likely to have participated in any technology training required by their school or district, but they tended to be more satisfied with their knowledge of technology and were more positive about the value of technology in their jobs. They were also much more likely to use technology for instructional purposes.

4

Recommendations

The following recommendations are offered as a guide for education policymakers and administrators at the national, state, and district levels to use as they oversee plans to purchase and install technology in schools and classrooms. They are intended as well for education advocates and practitioners who seek to understand their role in ensuring that technology is adequately integrated into the teaching and learning milieu of America's public schools.

1. Improve Technology Access

Although educators have been remarkably creative with limited computer access, greater saturation is clearly needed to make technology a seamless tool for learning. The number of computers in public school classrooms that are available for students' use should be increased in order to integrate technology fully into instruction. More creative ways should be sought to increase students' access to computers through portable and wireless technologies that are not bound by school infrastructures and are not restricted to school use only. As states and school districts develop and implement new plans for school technology, they should begin to invest in portable technologies that give students and staff more flexible access, and they should begin building the wireless infrastructures that can support the increased access to computers and other technologies that students will need to have.

2. Increase Internet Access, Software, and Technical Support

Programs designed to close the achievement gap must begin addressing issues related to Internet access, software, and technical support. Educators should have greater access to computer software for planning and instruction. Educators in urban schools, in particular, should have better instructional software, and more of them should be involved in making decisions about software purchases for their schools. Educators in elementary schools should have more age-appropriate software for students, but, just as importantly, more should be given access to high-speed Internet services.

Maintenance support for computers should be adequate in every public school to ensure that computers are in proper working condition and can be relied on for instruction. Quality technical support for computers and other technologies should be available in every school to ensure that educators receive the assistance necessary to set up and use equipment as well as to troubleshoot or fix problems. Particular attention should be given to senior high and urban schools, where maintenance and technical support are less likely to be provided. Districts should also encourage schools to engage the talents of their students by formally arranging for qualified students to provide technical assistance to staff and other students where technical support is needed.

3. Expand Professional Development in Technology and Integrate Use of Technology as a Learning Tool in Classrooms

Training to use technology should go beyond the uses for administration, communications, and research and should focus more on applications for instruction. Professional development in technology should be a required part of initial teacher licensure as well as relicensure, and it should be fully integrated into the ongoing professional development of all educators. Particular attention should be given to the training opportunities provided for educators in urban schools and to newer educators, who, in particular, believe that technology training in their schools has not been adequate.

Computers and other technologies should be used in classrooms as assistive learning tools that help educators design and present individualized lessons for students and help students develop cognitive skills through the manipulation and feedback generally provided in quality instruction.

Moreover, to expand the limits of information access, the curriculum standards in K–12 education should include technology as an instructional tool to facilitate learning through interactive, real-time, and other multimedia. The curriculum should require students to use technology as an integral part of their class work and in a manner that enhances their creativity and learning of higher-order skills.

Schools should capitalize on the enthusiasm that educators and students show toward using technology, particularly in urban and rural/small town schools, by seeking more ways to use technology for the greatest gain in student achievement. State and district leaders should encourage schools to use technology in more creative ways by permitting more flexibility in instruction and by providing incentives that support technology-enriched programs. More ways should be found to motivate the most experienced educators to use technology through better training and more curriculum-related opportunities.

4. Encourage Union or Education Association Support for States' and Districts' Plans to Fund and Provide Technology

Unions or education associations can play a critical role in helping schools achieve their vision for technology by supporting the development of technology plans and budgets and by helping to bring together viable funding sources. They should actively support the efforts of states and school districts in securing more funding for school technology by helping states and districts develop school technology plans, lobby state legislatures, establish partnerships with commercial and private enterprises, and secure federal and private grants.

Unions or education associations may also play a role in school technology by bringing the community, parents, and other groups together with schools to support school reforms that use technology to integrate the curriculum, instruction, assessment, and remediation of students. They can guide even more states and school districts through school reform efforts involving technology by bringing together the resources and expertise needed to develop the vision and then by helping to carry it out. Unions or education associations should also provide resources to states and school districts for developing and implementing comprehensive training programs for classroom teachers and other educators to use technology effectively—resulting in higher achievement for students of all groups and abilities.

APPENDIX

NEA–AFT Education Technology Issues Survey

NEA-AFT Education Technology Issues Survey

Introduction

My name is _____ and I'm calling on behalf of the [National Education Association] or [American Federation of Teachers].

May I speak to (Name) _____? [MUST SPEAK WITH PERSON LISTED, OTHERWISE TERMINATE.] [PLEASE REPEAT INTRODUCTION IF INITIAL RESPONDENT IS NOT THE PERSON LISTED ON THE SAMPLE]

We are conducting a brief survey among educators about the use of education technology in public schools. You were selected at random for this study and your name will not be used in any report. May I ask you a few questions? The survey will only take about 15 minutes.

[IF RESPONDENT IS SUSPICIOUS OR WARY, SAY:] We are not selling anything and I will not ask you for a contribution or donation. The survey will only take 15 minutes of your time and your phone number was selected at random.

Q1. Are you currently a member of an educational association such as the National Education Association or American Federation of Teachers?

- 1 _____ Yes [*Continue*]
 2 _____ No [*Thank and terminate*]
 99 _____ Don't know/refused [*Thank and terminate*]

Q2. Which education association or union do you belong to? [*Do not read choices*] [*Check all that apply*]

- 1 _____ NEA
 2 _____ AFT
 3 _____ Other (Specify: _____)
 99 _____ Don't know/refused

Now, I will need to get some information about the school you work in.

Q3. Are you still employed in a public school?

- 1 _____ Yes [*Continue*]
 2 _____ No [*Terminate, keep count*] Say: Thank you for agreeing to participate, but this survey is for educators who are currently employed in a public school.
 99 _____ Don't know/refused [*Terminate*]

Q4. What is your position?

- 1 _____ Teacher [*Continue*]
 2 _____ Paraprofessional [*Continue*]
 3 _____ Other [*Terminate, keep count*] Say: Thank you for agreeing to participate, but this survey is only for educators who are currently working as teachers or paraprofessionals.
 99 _____ Don't know/refused [*Terminate*]

Q5. Are you still working at _____ [Name of school FROM SAMPLE]?

- 1 _____ Yes [*Skip to Q6*]
 2 _____ No [*Continue*]
 99 _____ Don't know/refused [*Continue*]

Q5a. What is the name of the school where you are primarily assigned to work?

- [RECORD] _____
 99 _____ Don't know/refused

Q5b. What state is this school located in?

- [RECORD] _____
 99 _____ Don't know/refused

Q5c. What city is this school located in?

- [RECORD] _____
 99 _____ Don't know/refused

Q6. Is this a special school, such as a...? [*Read choices*] [*Check all that apply*]

- 1 _____ Special education school
 2 _____ Charter school
 3 _____ Alternative school
 4 _____ No
 99 _____ Don't know/refused

Q7. Which of the following community types is this school located in?

- 1 _____ Urban or city
 2 _____ Suburban
 3 _____ Small town
 4 _____ Rural
 5 _____ Other (Specify: _____)
 99 _____ Don't know/refused

Q8. At what level is your primary work assignment? [*Read choices*]

- 1 _____ Elementary [*Read 8a*]
 2 _____ Middle school or junior high [*Skip to Q9*]
 3 _____ Senior high [*Skip to Q9*]
 4 _____ Combination [*Skip to Q9*]
 5 _____ Other (Specify: _____) [*Skip to Q9*]
 99 _____ Don't know/refused [*Skip to Q9*]

Q8a. Do you work in an early childhood center?

- 1 _____ Yes
 2 _____ No
 99 _____ Don't know/refused

Q9. How many years have you worked at your current school? [Accept only numeric answer]

[RECORD NUMBER] _____

99 _____ Don't know/refused

Q10. How many years have you worked in education? [Accept only numeric answer]

[RECORD NUMBER] _____

99 _____ Don't know/refused

Q11. What is the primary subject that you teach? [Accept only one answer]

- 1 _____ Business
- 2 _____ Elementary education
- 3 _____ English/language arts
- 4 _____ English as second language (ESL)
- 5 _____ Fine arts (art, music, drama, etc.)
- 6 _____ Foreign language
- 7 _____ Library/media
- 8 _____ Math
- 9 _____ Physical education
- 10 _____ Science
- 11 _____ Social studies
- 12 _____ Special education
- 13 _____ Technology
- 14 _____ Other (Specify: _____)
- 15 _____ More than one subject taught equally
- 99 _____ Don't know/refused

Q12. On the average, how many students do you have in a class? [Accept only numeric answers]

[RECORD NUMBER] _____

99 _____ Don't know/refused

Q13. Which of these technologies have you used at school within the PAST 12 MONTHS? As I read the following list, please indicate "yes" or "no."

	Yes	No	DK/RF
a. Computer	1	2	99
b. Computer printer.....	1	2	99
c. Internet	1	2	99
d. Email	1	2	99
e. Television.....	1	2	99
f. Cable TV/satellite TV.....	1	2	99
g. Tape recorder	1	2	99
h. CD player	1	2	99
i. VCR/DVD player	1	2	99
j. Video recorder	1	2	99
k. Digital camera.....	1	2	99
l. Digital scanner	1	2	99
m. Overhead or LCD projector....	1	2	99

Q14. How many computers do you have in your classroom (or primary work area) for your students' use? [Accept only numeric answers]

[RECORD NUMBER] _____

99 _____ Don't know/refused

Q15. Approximately how many computers are there in the computer lab(s) at your school that can be used by students? This does not include the media center, library, or other locations. (Accept only numeric answers)

[RECORD NUMBER] _____

99 _____ Don't know/refused

Q16. Do you feel you have sufficient access at school to the technology that you need to do your job effectively?

1 _____ Yes

2 _____ No

99 _____ Don't know/refused

Q17. Does your school provide you with a laptop computer for planning and instructional purposes in or outside of school?

1 _____ Yes

2 _____ No

99 _____ Don't know/refused

Q18. Do teachers and paraprofessionals help make decisions about which instructional software to purchase in your school?

1 _____ Yes

2 _____ No

99 _____ Don't know/refused

Q19. Is your classroom (or primary work area) the main location at school where your students use computers for class work?

1 _____ Yes

2 _____ No

99 _____ Don't know/refused

Q20. Are additional computers available to bring into your classroom (or primary work area) on a short-term basis when necessary?

1 _____ Yes

2 _____ No

99 _____ Don't know/refused

Q21. Does your school provide students with laptop computers for their use away from school?

1 _____ Yes

2 _____ No

99 _____ Don't know/refused

Q22. Does your classroom (or primary work area) have access to the Internet?

- 1 _____ Yes
2 _____ No
99 _____ Don't know/refused

Q23. Do your students have access to a high-speed Internet connection in the school?

- 1 _____ Yes
2 _____ No
99 _____ Don't know/refused

Q24. Do you have access to the Internet at home?

- 1 _____ Yes
2 _____ No
99 _____ Don't know/refused

Q25. Does your school district or state provide assistance to educators to purchase computers for home, such as low-interest loans, grants, or discounts?

- 1 _____ Yes
2 _____ No
99 _____ Don't know/refused

Q26. Does your school district or state require you to participate in technology training?

- 1 _____ Yes
2 _____ No
99 _____ Don't know/refused

Q27. Rate the adequacy of the following technologies and resources in your school. Indicate whether they are “inadequate”; “adequate”; or “more than adequate.”

	Inadequate	Adequate	More than adequate	DK/RF
a. Software in your school for students’ use (e.g., word processing, graphics, remedial packages, individualized instruction)	1	2	3	99
b. Software in your school for teachers and other staff (e.g., word processing, graphics, spreadsheets)	1	2	3	99
c. The number of computers for students’ use in your classroom (or primary work area)	1	2	3	99
d. Working condition of existing computer equipment in your school	1	2	3	99
e. Technical assistance for setting up and using technology in your school	1	2	3	99
f. Technical assistance for trouble-shooting or fixing technology problems in your school	1	2	3	99
g. Training staff to use technology equipment that is in your school	1	2	3	99
h. Training staff to use administrative type software (e.g., word processing, PowerPoint, graphics, and spreadsheets)	1	2	3	99
i. Training staff to use the Internet for research and information	1	2	3	99
j. Training staff to use instructional software packages	1	2	3	99
k. Training on how to integrate technology into your daily instruction	1	2	3	99
l. Training to use technology to design individual lessons for students	1	2	3	99
m. Training on how to use technology to evaluate individual student progress	1	2	3	99

Q28. How often do you do each of the following? Indicate whether you do it “everyday”; “a few times a week”; “a few times a month”; “a few times a year”; or “never.”

	Day	Week	Month	Year	Never	DK/ RF
a. Use the Internet for research or information purposes.	1	2	3	4	5	99
b. Use technology to plan and prepare instruction . . .	1	2	3	4	5	99
c. Use technology to help instruct students	1	2	3	4	5	99
d. Use the computer for school administrative tasks (e.g., record-keeping, email, word processing).	1	2	3	4	5	99
e. Use technology to record and monitor individual student progress	1	2	3	4	5	99
f. Require students to use technology to do research or solve problems in class.	1	2	3	4	5	99
g. Require students to complete projects together on the computer, as a class or group.	1	2	3	4	5	99
h. Require students to use computers to complete exams in class	1	2	3	4	5	99
i. Assign homework to students that requires the use of a computer	1	2	3	4	5	99
j. Teach students using distance-learning applications	1	2	3	4	5	99
k. Share information or communicate with other teachers via computer.	1	2	3	4	5	99
l. Use the Internet to post student and class information	1	2	3	4	5	99
m. Communicate with parents via email	1	2	3	4	5	99

Q29. For the following statements, indicate whether you “strongly disagree”; “somewhat disagree”; “somewhat agree”; or “strongly agree.”

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	DK/ RF
a. I am satisfied with my knowledge of how to use technology in my work.	1	2	3	4	99
b. Overall, technology saves time in helping me do my job	1	2	3	4	99
c. My school has policies and procedures that prevent inappropriate uses of the Internet at school.....	1	2	3	4	99
d. Technology has improved my overall effectiveness in my job	1	2	3	4	99
e. My students have become too reliant on technology .	1	2	3	4	99
f. When used properly, technology really improves student learning	1	2	3	4	99
g. I believe technology is essential to teaching and learning	1	2	3	4	99
h. Improper uses of information on the Internet have caused the quality of student research to decline. . .	1	2	3	4	99
i. My students enjoy learning more when using technology	1	2	3	4	99
j. My education association or union should lobby for more technology funding.....	1	2	3	4	99
k. My education association or union does a good job of advocating technology training for educators	1	2	3	4	99
l. My education association or union should help to ensure that technology is evenly distributed across all schools for students	1	2	3	4	99
m. My education association or union should lobby for financial assistance to help educators purchase computers for home.....	1	2	3	4	99

Now, I have some final questions specifically about you:

Q30. What is your highest level of education?

- 1 _____ High school diploma or GED
- 2 _____ Associate’s degree
- 3 _____ Bachelor’s degree
- 4 _____ Master’s degree
- 5 _____ Doctoral degree
- 99 _____ Don’t know/refused

Q31. What is your age? [Accept only numeric answer]

[RECORD NUMBER] _____

99 _____ Don't know/refused

Q32. What is your sex?

1 _____ Female

2 _____ Male

99 _____ Don't know/refused

Q33. Are you of Hispanic or Latino Origin? [Read Q34 regardless of answer]

1 _____ No

2 _____ Yes

99 _____ Don't know/refused

Q34. What is your race or ethnic group? [Do not read list]

1 _____ American Indian or Alaska Native

2 _____ Asian

3 _____ Black or African American

4 _____ Caucasian or white

5 _____ Native Hawaiian or Other Pacific Islander

6 _____ Other (Specify: _____)

99 _____ Don't know/refused

[Thank and terminate interview]

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